Enterprise Resource Planning, Corporate Governance and Internal Auditing

An Institutional Perspective

Hany Elbardan and
Ahmed Othman Rashwan Kholeif

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To the memory of my late father, my mother, my wife Mayy, my daughter Malak and my son Yassin
Dr. Hany Elbardan

To my daughter Nour Kholeif and my son Mohamed Kholeif.
My lovely children, I pray for ALAH to protect you
Prof. Ahmed Othman Rashwan Kholeif

Preface

Corporate governance has received increased attention from both regulators and researchers in recent years resulting in highlighting the significance of the internal audit function (IAF). Another transformative force on the IAF has been the dissemination of enterprise resource planning (ERP) systems which have an impact on the legitimacy of the IAF if it is not suitably adapted. However, there is insufficient knowledge about the adaptations of the IAF which are required if it is to maintain its essential role in governance. This book extends our knowledge by exploring and theorising the adaptation of the IAF after ERP introduction. This book uses institutional theory as a lens through which to investigate how the IAF responds to the external governance pressures and the internal pressures of the control logic following the introduction of an ERP system. Data were gathered from two listed companies in the food and beverage sector and two large banks operating in Egypt, where one of each pair is an international company and the other is a national company. Interviews and focus groups were conducted with all stakeholders in addition to careful analysis of a number of internal and external documents related to the ERP and the IAF.

The book finds that governance pressures related to the IAF determine the legitimisation criteria for the IAF. There is little coercive governance pressure on the IAF in Egypt. However, international companies with operations in Egypt have introduced normative governance pressures as a result of their compliance with stock exchange rules in other jurisdictions. Therefore, mimetic behaviour has helped in transferring the IAF response to ERP implementation. ERP systems carry new control logics based on some interlinked assumptions, which have affected the IAF. The ERP system's control logic is aligned with the corporate governance goals and objectives, but further alignment is needed to make the best use of the ERP system in enhancing internal control. The introduction of an ERP system produces uncertainty about the IAF's activities, which motivates it to adapt by changing its practice and structure. The changes in the IAF are dependent on the strategic response adopted by the auditors, which range from acquiescence to defiance. These responses were found to change over time. The differences in responses result in different outcomes for the IAF adaptation. In the international companies, the implementation of an ERP system motivates the IAF to be integrated and have a comprehensive scope, whereas in the national companies, change was resisted and the role of the IAF was significantly diminished. The IAF's legitimacy maintaining strategies depend on the coercive and normative governance pressures, which give directions about how to maintain legitimacy. This book offers an explanation of how information systems contribute to the IAF's professional stability or change and of how macro-governance pressures can bind micro-IAF practice within organisations.

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Abbreviations

AIS	Accounting Information System
CAAT	Computer-Assisted Auditing Techniques
CMBPC	Continuous Monitoring of Business Process Controls
COBIT	Control Objectives for Information and Related Technology
COSO	Committee of Sponsoring Organisations of the Treadway Commission
EBI	Egyptian Banking Institute
ERM	Enterprise Risk Management
ERP	Enterprise Resource Planning
ESAA	Egyptian Society of Accountants and Auditors
IAF	Internal audit function
ICT	Information and Communication Technologies
IIA	Institution of Internal Auditors
ISA	International Standard on Auditing
IT	Information Technology
PwC	PricewaterhouseCoopers
SOX	Sarbanes–Oxley Act
XBRL	Extensible Business Resource Language

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1

Introduction

1.1 Background

This book focuses on changes in the internal audit function (IAF) following the introduction of an enterprise resource planning (ERP) system. ERP systems are cross-functional integrated systems consisting of software modules supporting operational activities such as accounting, control and human resources (Shehab et al. 2004). ERP systems were broadly implemented in many organisations to control diverse operations. ERP systems implementation implies new ways of designing functions, leads to new work procedures, changes job definitions and restricts flexibility in job tasks (Grabski et al. 2011). ERP systems are considered to be the most important and substantial IT infrastructure that interacts with the accounting functions in the last 15 years (Kanellou and Spathis 2013). ERP systems have implicit in their design a new institutional logic for controlling business and information (Gosain 2004). The IAF is one of the most interested functions in the IT infrastructure and its impact on the internal control system; therefore, it has been affected by ERP systems implementation.

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Corporate governance is defined as "the system by which companies are directed and controlled" (Cadbury Report 1992, p. 15). Internal auditing is considered as an integral part of the corporate governance mosaic, which play a significant role in assuring an effective internal control system. The IIA (2004) recognises the role of internal auditing in corporate governance. It asserts that the internal audit activity brings "a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control and governance processes". This book focuses on the corporate governance rules and regulations related to the IAF and the role of the IAF in contributing to the governance process through assuring the internal control system, where internal controls promote efficiency, reduce risk of asset loss and help ensure the reliability of financial statements and compliance with laws and regulations (COSO 2011).

The expanding opportunities for the IAF have been highlighted through the increased interest in better corporate governance practice (Ebaid 2011). This claim is supported by real-life cases which elucidate clearly the implications of underestimating the role that the IAF can and should play (Boyle et al. 2012). The series of corporate collapses such as Enron and WorldCom resulted in a growing number of rules and regulations that made a radical redefinition of the nature of the internal control linking it with the concept of risk. These risks are managed through accountability mechanisms, such as financial reporting, internal control and internal auditing (Sarens and Christopher 2010). The increasing public interest in corporate governance has motivated organisations to strengthen their IAF (Radu 2012). Egypt code of corporate governance (2005, p. 12) defines the aim of the IAF as "laying down systems for evaluating the means, methods and procedures of risk management within the corporation and for soundly implementing the rules governing corporate governance". The Egyptian code does not refer explicitly to the concept of internal control, unlike the codes of corporate governance in the UK and other countries.

Changes in the IAF have been broadly discussed in the literature (e.g. Boyle et al. 2012; Robson et al. 2007). Certainly, internal auditing has attracted the attention of the other governance actors (board of directors, audit committees and external auditors) who face external

pressures for assurance about corporate governance practice. Internal auditing is receiving more attention than ever before (Boyle et al. 2012; Carcello et al. 2005). However, despite the progress in the theoretical and empirical efforts to study IAF changes, in the governance and IT contexts and despite the consensus that asserts the role of the IAF as an actor in helping to tackle governance problems, there are important areas which have been overlooked and that need attention from both scholars and practitioners.

1.2 Knowledge Gap Addressed by the Book

The importance of having a sound internal control system has driven organisations to review their expectations of the IAF (Radu 2012). Legislative and professional responses to financial scandals have highlighted internal auditing as a key function to support internal controls, risk management and corporate governance processes; therefore, there are institutional pressures on organisations to maintain a developed IAF (Arena et al. 2006). Academic research as discussed by Gramling et al. (2004) has identified the IAF as being one of the cornerstones of corporate governance. Current auditing practice is criticised, and particular perceptions are formed concerning the necessity for improved internal auditing practice (Kotb and Roberts 2011).

Although the role of IT in organisations is perceived differently among different studies, the belief that IT is the motivator for change dominates in the information research community (Caglio 2003; Orlikowski 1992). Nevertheless, the focus of the relevant literature has been on ERP systems in general; there is limited published scientific evidence on the implementation of ERP and its effects on accounting or auditing in particular (Sutton 2006; Granlund and Malmi 2002). ERP systems have significantly changed methods of business data collection, storage, dissemination and use. ERP systems could act as a catalyst for IAF adaptation through affecting the internal control system within organisations. While the internal control objectives remain the same, the mechanisms of control are changed by implementing ERP systems. The traditional IAF, which looks only for errors, is insufficient after ERP

systems implementation (Kanellou and Spathis 2011; Madani 2009). The traditional boundaries of internal auditing are challenged as ERP systems complicate the IAF (Saharia et al. 2008). The IAF needs to be revamped with the emerging technology, and its relationship with all other parties also is affected (Paape et al. 2003).

With this level of acknowledged ambiguities and difficulties in mind, scholars repeatedly point out the inevitable need to adapt the IAF; otherwise, its legitimacy might be threatened because of the growing complexity of the IT and governance demands. After ERP systems introduction, internal auditing is particularly laborious and the requirement for automation of auditing tasks was never more urgent (Tryfonas and Kearney 2008). The ERP systems' control principle could force auditors to change their way of conducting audits. They reassess their audit models and move towards a business process and IS control orientation. Auditing after ERP systems implementation is a very complex task as it needs a high level of technical knowledge and internal control becomes too difficult to be assessed by traditional auditors (Hunton et al. 2004). It is essential for professional groups such as internal auditors to constantly update their knowledge and skills to maintain a grasp of their field or extend their expertise into new fields (Abbott 1988). This professional development might include gaining some knowledge and skills of other professional groups (Caglio 2003). Given that specialised IT knowledge is not traditionally part of the education for the internal auditors, this might encourage non-auditors to take over some of the internal auditor's role, especially after ERP systems introduction.

In order to play a key role in corporate governance, the IAF needs to establish credibility and maintain legitimacy by demonstrating its capabilities for adding value. ERP systems give auditors a chance to look at how audit is performed and make improvements. In accordance with institutional theory (DiMaggio and Powell 1991; Meyer and Rowan 1977), failing to be equipped to respond to new challenges leads to legitimacy problems (Power 2003). As confirmed by Suchman (1995), threats to legitimacy cause problems in gaining, maintaining or repairing legitimacy. In the case of the IAF, failing to assure the effectiveness of internal controls would lead to legitimacy problems for auditors. Internal auditors and organisations are likely to be particularly

interested in the role that adaptation may play in legitimising itself and its IAF in comparison with others. Therefore, investigating the adaptation at the individual organisational level may reflect not only considerations of efficiency and effectiveness, but also position the IAF in relation to other professions and other organisations.

Internal auditing practice is social constructions, where agreement among professionals is essential before something can be counted as legitimate practice by the profession. However, there is no agreement in the literature regarding the drivers for IAF change or the nature of the IAF adaptation after ERP system introduction.

ERP systems have an embedded logic that gives rise to new legitimisation rules which are then enacted as new practice and positions (Gosain 2004). Thus, the way of working suggested by ERP functionalities may lead to the redefinition of the rights and obligations of internal auditors. With the implementation of ERP systems, the positions of professional groups should not be considered as fixed (Caglio 2003). This may represent an opportunity for organisational actors to extend their knowledge to strengthen their professional legitimacy. However, such professional development may be matched by a movement in the opposite direction. Internal auditors may have to face the erosion of their preserve by other competing professional groups, and the extent of this erosion depends on their ability to protect their occupational jurisdiction. Therefore, this book tries to explore the ambiguous and often inconsistent consequences for internal auditors deriving from the introduction of ERP systems.

Although there is considerable literature on the potential impacts of ERP systems on audit (Kanellou and Spathis 2013; Grabski et al. 2011; Madani 2009; Saharia et al. 2008; Hunton et al. 2004; Spathis and Constantinides 2004), there is a scarcity of information on the key drivers of audit change (Robson et al. 2007) and the nature and direction of that change.

To date, research has pointed out the increased importance of the internal audit after ERP systems implementation. For example, Spathis and Constantinides (2004) find that the only notable change in accounting practice is related to the increased use of the IAF. Moreover, Kanellou and Spathis (2013) find that ERP systems often result in improved internal audit.

The insights gained to date have a number of limitations. First, there have been no previous studies that address the internal auditing adaptations as a response to ERP systems implementation (Kanellou and Spathis 2011). Second, most of the studies regarding the IAF and ERP systems have taken place in the developed countries such as the USA and the UK (Kholeif et al. 2007; Ebaid 2011), while ignoring developing countries where there is growing attention to the corporate governance process and a diffusion of ERP systems. ERP built-in practice and logic are derived from developed countries and so are not necessarily appropriate for developing countries, but the previous literature has not explored this issue (Soh et al. 2000). Finally, according to Abdolmohammadi and Boss (2010), studies have focused on addressing the changes in external auditing, while very few are driven by the internal audit view.

The IAF adaptations after ERP systems implementation are an under-researched area that requires more attention (Grabski et al. 2011; Kanellou and Spathis 2011, 2013; Nwankpa and Datta 2012). Moreover, Grabski et al. (2011) suggest that there is a lack of a strong theoretical base in ERP studies. However, there are different levels of analysis in research on ERP systems offering interesting new insights. Mignerat and Rivard (2009) suggest that there is room for contributions by applying institutional theory at sub-organisational levels such as groups, departments and functions. Therefore, the book responds to institutional theorists' calls to understand how ISs contribute to functions change and stability.

Consistent with recent studies (e.g. Grabski et al. 2011; Kanellou and Spathis 2013) and based on the literature analysis, this book finds a continuing need to bridge a knowledge gap stemming from the lack of a multilevel lens that explores the macro- and micro-institutional pressures on IAF adaptation. It is found that the field lacks in particular an empirically verified lens that can offer an in-depth understanding of the pressures that are associated with the IAF change and the nature of needed adaptations. Moreover, Rose and Kræmmergaard (2006) suggest that a research focus on change and actors' perceptions of evolving conditions is likely to reveal new and challenging insights and contribute to AIS research.

1.3 The Purpose and Objectives of the Book

The purpose of this book is to explore, through using the institutional theoretical lens, the adaptation in the IAF's practice and structure as a response to the new control assumptions carried by ERP systems and the increased IAF-related governance pressures, in order to maintain its legitimacy. The book aims to add to our knowledge of how ERP systems motivate adaptation in the IAF to maintain the acceptability of its role by its stakeholders as a corporate governance actor. This should contribute to our understanding of these issues and the development of a frame of references, which can be used to support the IAF adaptation.

The specific objectives of the book are:

- To critically review the ERP literature related to the accounting and auditing field with particular focus on the IAF and to identify and evaluate governance factors influencing the IAF
- To design an appropriate theoretical research framework
- To make an informed decision about the appropriate research methods and analytical tools to be adopted
- To verify the framework within the practical arena and to provide a novel contribution to the domain of ERP systems and IAF.

The book addresses one overarching issue:

How does the IAF respond to the external governance pressures and the internal ERP systems' logic pressures in order to maintain its legitimacy as a governance mechanism?

This is broken down into a number of subsidiary issues:

RQ1. What is the macro-governance pressure associated with the IAF and how do these pressures direct the IAF practice and structure in the sub-organisational level?

RQ2. What are the control assumptions of ERP systems that have impact on the IAF and how do the participants perceive these assumptions?

RQ3. How has the alignment between ERP systems logic and governance been made?

RQ4. How does the IAF adapt after ERP system introduction and how does this relate to the governance pressures?
RQ5. How do these adaptations affect the legitimacy of the IAF?

1.4 Significance and Scope of the Book

Prior studies tend to agree about the need for IAF change after ERP systems implementation; however, no sufficient evidence has been revealed about the nature and direction of the required adaptation in the practice and the structure of the IAF. This book is expected to fill a gap that exists in prior research related to governance, ERP systems and the IAF. It makes a significant contribution to the academic IS and accounting literature as it addresses a topic that is timely and of interest not only to academics, but also to the audit practice community. It is a topic that has generated considerable discussion in both environments, as organisations spend major portions of their budgets on ERP systems and want to improve their governance process.

This book contributes to the knowledge of the relationship between ERP and internal auditing, which will be of value to any organisation considering ERP systems implementation and needing to know what are the proper internal audit practice and structure. Moreover, educational institutions will be interested in the results of this book as it will investigate the qualities which are required in the internal auditors in the ERP-based organisations. Regulators who issue the standards followed by internal auditors will benefit as well. Practitioners also need to know the kind of training, skills and knowledge they require before working in ERP-based organisations. Furthermore, the results of this book provide stimulus for consequent research in the field in order to further examine and account for the internal auditing benefits that can occur from ERP systems implementation as well as the effect of these benefits on the governance process.

This book contributes to the academic field through offering an empirically validated theoretical frame to analyse and explore the pressures affecting the IAF. Previous studies have failed to produce a multilevel holistic framework to understand the role of the macro- and

micro-factors impacting the IAF arrangement. This book offers a lens to explore these factors and simultaneously produces a novel multifaceted framework for analysing the unsolved issues in the field. The book also contributes to advancing the field theoretically, practically and methodologically.

The scope of this book is restricted to the study of one particular mechanism of corporate governance (the IAF) and one particular information system (the ERP system) in one developing country (Egypt).

1.5 Structure of the Book

The remainder of the book is structured as follows. The next chapter provides a critical review of the literature on accounting, auditing, corporate governance and ERP. It evaluates previous studies that have focused on the intersection between the fields of accounting and information systems. Chapter 3 discusses the legitimacy of internal auditing practice. It concludes by identifying gaps in the literature that are addressed by the book.

This is followed by Chap. 4, which presents the conceptual framework and discusses its main concepts, factors and sub-factors. The evolution of the framework is described to show its theoretical roots. The framework is based on the findings from the literature and the pilot stage.

The interpretive approach for data collection and analysis is discussed in Chap. 5. It identifies the research paradigm and links it with the research design. It also explains and justifies the research methods used to select the cases and to collect and analyse the data.

Chapters 6–9 present the findings from the analysis of the individual case studies, while Chap. 10 provides a discussion of the findings from the cross-case analysis and highlights the lessons that emerged from the main findings of the book.

The final chapter draws a conclusion and discusses the theoretical, practical and methodological contributions of the book. It ends with a discussion of the limitations of the book and identifies areas for further study.

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2

ERP, Internal Auditing and Corporate Governance

2.1 Introduction

The body of the literature suggests that ERP systems are able to motivate adaptation in the work of many professional groups within organisations and may threaten their legitimacy if they are not suitably adapted. However, there is no sufficient evidence related specifically to the IAF. This chapter critically analyses the multi-disciplinary literature with a particular focus on the relationship between ERP and IAF, with a view to identifying gaps in the literature. In doing so, this chapter attempts to draw out the main directions and key themes in the field to cultivate a mature and solid understanding of the phenomenon.

This review starts by evaluating the IS literature related to the role of ERP systems in changing the working environment within organisations and functions, where the IAF is one of these functions. This review helps the examination of studies of the potential impacts on the risk-control landscape that is the main concern of the IAF. Then, the literature related to internal auditing as a governance function is reviewed, shows that the IAF needs to adapt to maintain its legitimacy as a governance mechanism.

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The AIS literature on the ERP systems impact on the accounting field is reviewed to draw a roadmap for studying the impact of ERP systems on the IAF. This helps in identifying the theories, methodologies and research strategies used in this area and makes suggestions appropriate to fill the research gap.

In order to determine how the IAF adaptation can be investigated, the literature related to the aspects of the IAF which might change is reviewed, whether the changes are a response to IT pressures or to governance pressures. Finally, the conclusion of the chapter is outlined.

2.2 ERP System as a Change Agent

ERP systems play an essential role in the daily operations of modern business organisations. Generally, the influences of IT on the structure and practice of many professions have long been recognised. For professional groups, new advances in IT cause a change in many aspects of their professional development (Walsham 1998). The implementation of ERP systems implies by necessity new ways of designing tasks, jobs and work modules, communications within organisations and work structures and procedures (Kallinikos 2004).

2.2.1 ERP Concept

ERP systems are one of the most important innovations in the world of IT. It has become one of the most widespread IT solutions, which is the backbone of many big enterprises in the world (Alshawi et al. 2004). According to Chung and Snyder (2000), ERP systems have been developed to be highly configurable to accommodate the needs of diverse sectors of the economy such as the manufacturing and finance sectors. Therefore, ERP has attracted increasing attention from researchers and practitioners (Momoh et al. 2010).

While ERP systems have gained relative prominence in the literature, there is dissent among academics on the nature and definition of ERP. For instance, Davenport (1998) defines it as a commercial software

package that promises the seamless integration of all the information flowing through a company. Furthermore, Pawlowski et al. (1999) posit that ERP is not a term referring to a distinct object but rather an "umbrella term" referring to a range of similar products. Klaus et al. (2000) consider ERP as a development objective mapping all processes and data of an enterprise into a comprehensive integrative structure. According to Kumar and Van Hillsgersberg (2000), these systems are configurable IS packages that integrate information and information-based processes within and between functional areas. Moreover, Shehab et al. (2004) define ERP systems as business management systems that include integrated sets of comprehensive software, which used to manage and integrate all the business functions within an organisation. These sets usually consist of business applications for financial and cost accounting, sales and distribution, materials management, human resource and supply chain management. Others (e.g. Dillard et al. 2005; Trimi et al. 2005) define ERP systems as enterprise-wide packaged software applications that tightly integrate and manage information flows and business functions within and across the organisation into a single system with a shared database.

A central concept that can inform our understanding of the nature of ERP is that it is integrated information architecture, and this integration may vary in scale or scope (Chapman and Kihn 2009). According to Granlund and Malmi (2002), the level of systems integration is a continuum which goes from a collection of stand-alone systems to a completely integrated system, where a company that implements only a few modules of the ERP is somewhere in the middle of the continuum. In their case study, only the financial and accounting modules of the software had been implemented and they regard this as an ERP system.

Based on these different perspectives and for the purposes of this book, ERP systems can be defined as "Business management systems, which are module-based integrated software packages, control the seamless integrated information flow and process across functional areas within the organisation and include at least the financial and accounting module and any other module as a single system with a shared database".

2.2.2 Organisational Change and ERP Implementation

ERP systems implementation involves broad organisational changes in business processes and significant implications for the management model, structure and individuals within organisations (e.g. Pawlowski et al. 1999; Maheshwari et al. 2010). Volkoff (1999) highlights the organisational changes brought about by ERP systems which can affect the social environment and reform the entire information infrastructure. Moreover, Robey et al. (2002) view ERP implementation as a dialectic process involving forces promoting and opposing change. Additionally, ERP has the ability to act as a force for radical social change (Lengnick-Hall et al. 2004).

Davenport et al. (2004) confirm that ERP imposes its own logic on organisations. Therefore, ERP implementation can be viewed as organisational change projects. ERP is a kind of management innovation which involves the introduction of novelty and represents a particular force of organisational change. Furthermore, Pollock and Williams (2008) provide evidence that there is always a wide gap between system capabilities and the context-specific requirements and practice of the implementing organisations. Therefore, several tensions and challenging discrepancies appear and need to be addressed after using these systems.

ERP systems are a significant factor in the users' real lives. Different groups experience particular losses or gains from ERP implementation (Yeh and OuYang 2010). Based on the socio-technical nature of the organisational change process that arises from ERP systems implementation, several researchers have identified the need to uncover the dynamics of the organisational change process (e.g. Lyytinen and Newman 2008). Organisational actors' values need to be considered in ERP implementations. For organisational actors, both diversity and free choice of actions became more limited. They need to learn a new way of working, cooperating in a network system and understand how and why their processes have changed. These requirements meant that professional groups have to change how they think about their work and the types of relationships within and between organisations (Lengnick-Hall et al. 2004). According to Yeh and OuYang (2010), most ERP researchers have evaluated ERP implementation from a technological

perspective and have paid less attention to managerial and human perspectives. Additionally, Davenport et al. (2004) suggest that organisations with highly advanced abilities to use information derived from an ERP have the potential to alter their job roles and change their organisational structures.

In this book, ERP systems are treated as independent products capable of initiating socio-technical organisational change process affecting the organisational actors' practice and structures. This is not an uncontroversial stance, but it is a part of the debate in research on ERP systems (Kallinikos 2004). Additionally, investigating ERP systems in these terms does not disregard the significance which the implementation process may have in reshaping these systems to the demands of certain organisations.

2.2.3 ERP and Organisational Risks

Many studies have discussed risks associated with ERP systems from different perspectives (e.g. Adam and O'Doherty 2000; Klaus et al. 2000; Soh et al. 2000; Sumner 2000; Ragowsky and Somers 2002; Scott and Vessey 2002; Al-Mashari 2003; Huang et al. 2004; Shehab et al. 2004; Genoulaz et al. 2005; Trimi et al. 2005; Zafiropoulos et al. 2005; Ojala et al. 2006; Hakim and Hakim 2010). Most of these studies agree that ERP systems are risky and mention that risks revolve around implementation, technicality and functionality.

ERP implementation necessitates some pivotal changes in organisations based on reengineering and customisation efforts. Mabert et al. (2001) found that these efforts cause risk of resistance to change, reluctance to learn new ways of doing jobs or reluctance to accept new responsibilities, while Wright and Wright (2002) assert that these changes increase the potential for control weaknesses and may result in financial-statement errors or inaccurate internal information. Additionally, Hakim and Hakim (2010) find that the main implementation risks include: organisational risks such as the degree of required changes and capabilities in process reengineering; technical skills risks that include ability to attract and maintain qualified staff, optimal utilisation of internal employees,

cross-technical training and exchange of knowledge between groups; system risks that include identifying and understanding the changes required and user risks that include system comprehension by the users, coordination among departments and resistance to change.

According to Adam and O'Doherty (2000), ERP technical risks include the tight integration of application modules and data and privacy concerns. O'Leary (2000) suggests that the interdependent nature of ERP systems' applications and the reliance on relational databases expose an organisation to different business interruptions than traditional systems. This is confirmed by Wright and Wright (2002) that ERP system presents risk due to the linked interdependencies of business processes and relational databases. They add that ERP systems increase security risks, which may increase financial-statement risk if access is not adequately and periodically monitored. O'Leary (2002) comments on Wright and Wright (2002) and asserts that there are key problems in the area of ERP systems controls and security. Hunton et al. (2004) provide evidence that ERP creates concerns about system security, database security and control risk because of process interdependency. So a security concern in one department may lead to jeopardising the entire ERP system. Aloini et al. (2007) assert that ERP systems impose a risk that an error in one part of the system brings down the entire system and disrupts the organisation's business processes. Moreover, Hendrawirawan et al. (2007) suggest that integration increases the risk of fraud by users who have excessive authority.

Some authors (Adam and O'Doherty 2000; Soh et al. 2000; Sumner 2000) provide evidence that functional risks arise from the challenge of incompatibilities between systems and organisational needs in regard to processing procedures and the presentation format and the information content of the output. Although most ERP systems have been adapted to the specific business practice model, not all of them are necessarily appropriate for a specific organisation. These risks can lead to inappropriate access, missing validation procedures, inappropriate operational steps, inappropriate output formats and incorrect information content of input (Soh et al. 2000).

This review shows that ERP systems introduce more risks that are important to deal with and mitigate through proper control and audit and assurance functions. On one side, and building on Hakim and Hakim (2010) and Sumner (2000), it can be claimed that the improper adaptation, change and the improvement of capabilities and reengineering of the IAF after ERP systems implementation can be considered as organisational risks. Attracting and maintaining qualified internal auditing staff, optimal utilisation of internal auditors, inappropriate technical training and exchange of knowledge between auditors and other groups after ERP systems implementation can be considered as technical risks. System comprehension by auditors, coordination among audit department and other departments and resistance to changes can be considered as user risks.

According to Wright and Wright (2002), ERP increases the potential for control weaknesses. Therefore, it is important for those whose responsibility it is to provide assurance to be aware of these unique risks in planning and executing internal auditing. This will affect one of the main roles played by the IAF in providing assurance about the ability of the internal control systems to mitigate risks.

2.2.4 ERP and the Control System

Control risk increases when advanced technology is implemented for accounting and IS. Traditional internal controls are insufficient in preventing or detecting errors for accounting systems with advanced IT (Huang et al. 2004). ERP systems are likely to shift the locus of control and related activities. The integrative nature of ERP systems affects many control issues such as control planning, control monitoring, authorisations, reconciliations, segregation of duties and risk assessments (Rikhardsson et al. 2005). However, there is a debate on the ambivalent nature of this change (Pawlowski et al. 1999; Rikhardsson and Kræmmergaard 2005; Grabski et al. 2011). On the one hand, ERP may bring about the relaxation of control (Davenport 1998; Sia et al. 2002; Wright and Wright 2002). On the other hand, it may tighten internal control (Elmes et al. 2005; Rikhardsson et al. 2005; Rajan and Saouma 2006; Chapman and Kihn 2009).

For example, Sia et al. (2002) assert that ERP results in expanding job scopes, thus making the jobs of some employees more powerful than before, which directly contradicts the traditional control principle of segregation of duties in the auditing literature. Wright and Wright (2002) confirm that with ERP implementation, controls and security aspects are going to change.

Moreover, some authors (e.g. Bae and Ashcroft 2004; Madani 2009) discuss that implementation risks could result in inadequate new business controls because of the reengineering process. During this process, traditional controls could be eliminated without replacing them with new effective controls. Sayana (2004) finds that ERP systems are designed as configurable solutions that can operate in many countries and industries. This adaptability in the ERP can lead to internal control weaknesses by allowing options that were completely prohibited in the past. Sayana (2004) asserts that ERP systems enable data entered at one stage of the process to be forwarded to the next stage with implicit acceptance of its validity and there is often no reverification at different stages. The impact on controls is that there is no room for checking along the way.

However, some studies (Poston and Grabski 2001; Rikhardsson et al. 2005; Chapman and Kihn 2009; Emerson et al. 2009) found evidence that ERP systems facilitate the automation of some control activities, reduce manual tasks and enable stricter controls. ERP systems effectively eliminate the idea of data flow and replace it with enterprise-wide data access, thereby enhancing data security, accuracy and integrity. ERP systems enable integrated information for greater visibility of employees' activities (Elmes et al. 2005). Orlikowski (1991) argues that control is probably tighter as the range of opportunities for individual choice is constrained, simultaneously enhancing the hierarchical visibility of the remaining choices. The integrated business processes reduce errors (Soh et al. 2000; Mabert et al. 2001), result in data interdependency where data inconsistencies are clearly flagged (Sia et al. 2002) and facilitate the matching of documents (Chapman and Kihn 2009). Rajan and Saouma (2006) confirm that the relative information advantage of the manager is a function of the implementation of ERP systems. In settings where the information generated by these systems can be

monitored by the owner, more information is better as this help in solving the issue of the asymmetric information. O'Leary (2000) asserts that ERP systems enhance control through standardised information, enable standard operational processes and increase organisational formalisation and controls. ERP helps organisations control their activities by centralising information (Ragowsky and Somers 2002). Yeh and OuYang (2010) suggest that organisations need to learn how to manage and control the working environment of these systems.

Based on the previous debate, it can be stated that there is no clear understanding of the impact of ERP systems on the internal control system. This confusion about the impact of ERP systems on the internal control system affects the internal auditors' ability to provide a reliable assurance about the control system. Therefore, internal auditors need a comprehensive view and adaptation to the new risk-control landscape after ERP systems implementation in order to gain the best results and add value to the governance practice.

2.2.5 ERP and Corporate Governance

Corporate scandals such as Enron in the USA and HIH in Australia have reinforced the need to pay careful attention to corporate governance as a mechanism to ensure that the needs of governments and shareholder are met. There is no universally accepted definition of corporate governance. In the UK, the Cadbury Report (1992, Section 2.5) describes corporate governance as the system by which companies are directed and controlled. According to the Egypt governance code, "Principles of corporate governance describe the rules, regulations and procedures that achieve the best protection of and balance between the interests of corporate managers, shareholders, and other stakeholders" (p. 4). Hermanson and Rittenberg (2003) expand the IIA's definition of governance as follows:

> Governance processes deal with the procedures utilized by the representatives of the organization's stakeholders to provide oversight of risk and control processes administered by management. The **monitoring** of organizational **risks** and the **assurance** that **controls** adequately mitigate

> those risks both contribute directly to the achievement of organizational **goals** and the preservation of organizational **value**. Those performing governance activities are **accountable** to the organization's **stakeholders** for effective **stewardship**. (Hermanson and Rittenberg 2003, p. 27)

Based on these definitions, the governance framework includes policies, performance measurements and controls, which direct and align work towards achieving goals. The corporate governance efforts focus on improving transparency and accountability and clarifying the division of roles between management oversight and business execution.

Where the scale and scope of ERP systems affect full business transformations, corporate governance becomes important. Carroll and Fitz-Gerald (2005) suggest that ERP systems raise the issue of corporate governance; however, they focus on the impact of the organisational governance on the ERP systems implementation. Chen (2009) suggests that ERP systems should be considered not only as IS, but also as a part of corporate governance systems and suggests that to leverage the value of ERP systems, organisations should consider the alignment of the internal control and audit function, corporate governance and information technology (IT) governance.

According to Chen (2009), governance issues are important topics in ERP research. Chen et al. (2012) conclude that after ERP implementation, the focus of internal control is shifted to cover the whole business operations not only the accounting operations. This will strengthen internal control to reinforce corporate governance. Furthermore, according to Grabski et al. (2011), ERP systems offer several benefits for risk management such as internal controls, an enhanced audit trail and compliance and governance extensions. They suggest that some critical areas deserving extended focus include the auditing in the ERP work environment especially the design of control systems and auditors' expertise.

In order to achieve successful corporate governance, the governance structures and the governance practice should be aligned, so that the formal structures become an accepted part of practice within an organisation. ERP systems can narrow the gap between intentions and actions relating to governance processes that means the difference between the

documented governance structure and the governance activities enacted in everyday organisational life.

2.3 IAF as a Governance Mechanism

Almost two decades ago, Kalbers and Fogarty (1995) found that a wide range of practitioner literature exists in the area of internal auditing, while the academic literature on internal audit practice was relatively limited. Moreover, according to Boyle (1993), academic literature on internal audit practice gave less attention to the well-structured research models that help in the understanding of contemporary internal audit practice. Page and Spira (2004) confirm that the corporate governance requirements have an impact on the IAF. Carcello et al. (2005) suggest that internal auditing is enjoying prominence and attention unlike ever before.

Nevertheless, according to Sarens and De Beelde (2006a) the existing literature, standards and practice advisors suggest that the internal auditing is influenced by several variables such as governance rules and IT developments; therefore, it needs more attention. IT cannot by itself enhance the effectiveness of corporate governance practice. The main efficiency factor depends on the way internal auditing changes its structure and practice and communicates as a response to the use of these technologies. Therefore, Allegrini et al. (2006) assert that the continuous evolution of internal auditing requires the synthesis of research findings and constant updating of the professional body of knowledge. Additionally, Sarens et al. (2011) suggest that there are promising research opportunities to critically evaluate whether the traditional internal audit activities are still sufficient to meet the contemporary needs of organisations.

2.3.1 IAF Concept

Just after the IIA establishment at 1940, internal auditing was perceived as an extension of external auditing and it was concerned strictly with accounting verification within organisations as assistance

to external auditing (Kagermann et al. 2008; Bloom et al. 2009). Starting as a function primarily focused on protection against fraud and loss of assets, its scope was extended to include verifying almost all financial transactions and gradually moved from "audit for management" to an "audit of management" approach (Bailey et al. 2003). Lately, according to Bloom et al. (2009), internal auditors became management consultants examining not only accounting but also non-accounting functions.

After a debate between practitioners, academics and the accountancy professions, the IIA (1999) defined internal auditing as "an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. It helps an organization accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes". This definition highlights the valuable contribution of internal auditing. It is designed to add value and improve organisations' operations. Such a perspective expands internal auditing's working domain to include risk management and control and governance processes. Nagy and Cenker (2002) have investigated whether the new internal audit definition really reflects the day-to-day activities of the IAF. They found that the new definition describes the current practice.

2.3.2 IAF-Related Governance Rules

Numerous standards and legal requirements address the internal audit process. In the USA, for example, these include the Sarbanes-Oxley Act (SOX 2002), NYSE Listing Standards (SEC 2003), COSO Internal Control Integrated Framework (COSO 2011), COSO Enterprise Risk Management Integrated Framework (COSO 2004), Control Objectives for Information and Related Technology (COBIT) and the Public Company Accounting Oversight Board (PCAOB). The latter suggests that a complementary benefit of its standard is "encouraging companies to invest in competent and objective internal audit functions" (PCAOB 2004, p. 10).

Prior the issuance of SOX (2002), external auditors had a main role in facilitating the implementation and auditing of internal control systems, including IT audits. However, this situation has changed after SOX (2002). First, SOX (2002, Section 404) puts the responsibility for internal control systems documentation and evaluation on the management, who have passed on much of the responsibility to the internal auditors. Second, external auditors are not allowed to provide certain services such as the financial internal audit outsourcing services (SOX 2002, Section 201). So it becomes difficult for organisations to depend mainly on external auditors in providing guidance relating to IT audits. The responsibility for the IT audits has increasingly fallen on the internal auditors of the organisation.

While in the UK standards and guidance include the Turnbull Report (1999) that has the purpose of providing guidance on certain aspects especially those dealing with internal control, risk management and internal auditing, in Europe the European Confederation of Institutes of Internal Auditors (ECIIA) has adopted a strong position towards the internal audit role in corporate governance (Paape et al. 2003).

The Basel Committee issued three publications which merit the attention of the internal auditor, especially the internal bank auditor:

- *Enhancing corporate governance in banking organisations* (1999) addresses a number of issues, such as risk management and audit functions
- *"Internal audit in banks and the supervisor's relationship with auditors"* (2001) emphasises the significant role of the internal auditor in the evaluation of internal control processes
- *The internal audit function in banks* (2012) promotes a strong IAF within banks.

These standards and legal and professional directions pressurise organisations to maintain a sound IAF which adds value by enhancing governance. There are challenges for internal auditing profession and activities to significantly adapt to cope with the evolution of governance requirements (Bailey et al. 2003).

2.3.3 The Governance Role of the IAF

The increasing public interest in governance issues has resulted from the financial crisis and repeated financial scandals which have driven organisations to review their expectations of the IAF (IFAC 2006). This raises the importance of the IAF as a key component of good corporate governance practice (Spira and Page 2003). Internal auditing has established its position as essential within the corporate governance field (Paape et al. 2003). Gramling et al. (2004) point out that the IAF quality has an impact on the quality of corporate governance. The internal audit central role in corporate governance has gained increasing attention, because of its importance to the internal control and risk management. These are the two important aspects of corporate governance.

Such shifts have had the purpose of increasing the value added by internal audit to organisations. However, Arena and Azzone (2009) point out that these changes require a redesigning of internal audit structure and activities. Selim et al. (2009) assert that the move away from a narrow scope of evaluating the effectiveness of internal controls towards a broader range of activities created opportunities for the profession to reexamine its structure and practice. Sarens (2009) points out that very few studies have investigated the relationship between internal audit and governance.

Carcello et al. (2005) examine the internal auditing changes during the time of the Enron and WorldCom financial disasters and the related focus on internal control and corporate governance. Their findings show that internal audit budgets, staffing levels, meetings and meeting length with the audit committee have increased noticeably from 2001 to 2002. They suggest that the IAF has changed in numerous ways during the time of the accounting scandals in the USA. They encourage additional research to examine changes in the mix of the internal audit's activities and the structure of the IAF. Moreover, they encourage research on this topic in other countries.

The two main governance activities for internal auditing are "monitoring risks" and providing "assurance regarding controls" (Bailey et al. 2003; Hermanson and Rittenberg 2003); therefore, the next two subsections will discuss these activities.

2.3.3.1 ERP and IAF Role in Risk Management

Risk assessment and risk management are major aspects of corporate governance. The responsibility of internal auditors is mainly risk assessment and assisting management with their responsibility for risk management (Cattrysse 2005). Sarens (2009) points out that the internal audit's role in monitoring and improving risk management has turned out to be an important contribution to corporate governance. There is evidence (e.g. Arena and Azzone 2009) of the added value from the active support of the internal auditors in risk management. Sarens and De Beelde (2006b) stress that top managers expect internal auditors to assist them in formalising risk management systems and gaining a reasonable level of awareness of risks and controls. In addition, Marshall and Magliozzi (2009) find that internal auditors have a strong desire to improve their knowledge and skills in enterprise risk management (ERM), despite their relatively high competency levels in these areas.

The legitimacy of the internal audit strongly depends on its capability to monitor and improve risk management that is clearly referred to in the definition of internal auditing (IIA 1999). According to the IIA Position Statement (2009, p. 3), the internal auditor's role in ERM is to "provide objective assurance to the board on the effectiveness of an organization's ERM activities to help ensure key business risks are being managed appropriately and that the system of internal control is operating effectively". The standards of internal auditing (IIA 2009) present substantive changes designed to enhance the internal audit's contribution in monitoring, assessing and reporting on the effectiveness of the risk management process. Moreover, Bloom et al. (2009) assert that the COSO model (2004) has a primary objective, which is asserting the responsibility of the internal audit in identifying risks that are most likely to obstruct the organisation in achieving its objectives.

ERP systems have some risks associated with them, but also these systems offer some tools that can be used for risk assessment and management. ERP systems have introduced some new opportunities and challenges in managing internal and external risks (Saharia et al. 2008). There are some ERP-based risk management applications which have built-in diagnostic tools that test and continually monitor

system activity and configuration changes (Emerson et al. 2009). Glover (1999) claims that internal auditors possess skills that are crucial particularly in the area of risk management after implementing ERP and they are well positioned to add value in this area.

Some studies investigate the ERP's impact on the auditors' role in managing risks (Wright and Wright 2002; Hendrawirawan et al. 2007; Saharia et al. 2008). For example, Wright and Wright (2002) suggest that it is essential for assurance providers to be aware of the unique risks associated with ERP systems. Hendrawirawan et al. (2007) find that most of the security tools offered in ERP packages are not designed to facilitate the audit. Also, there is a shortage of internal audit staff members trained in ERP security. Saharia et al. (2008) conclude that ERP systems lead to improvement in internal auditors' ability to assess risk in all categories of operations. They find that ERP systems reduced financial risks while improving internal auditors' capability of assessing and managing these risks. They find that ERP systems are perceived as providing internal auditors with better tools to assess and manage technology-related risks. ERP systems increase IT competence risk as they place unique requirements on internal auditors in the workplace (Parent and Reich 2009).

The internal auditors' role in risk analysis and management for an ERP-based organisation should include (Cerullo and Cerullo 2000; Hespenheide et al. 2007; Madani 2009): recognising the range of risks in the ERP cycle being audited; connecting the identified risks with potential applications; determining the annual cost of each ERP exposure; selecting relevant internal controls for the ERP exposures by selecting cost-effective controls; advising the management on optimal resource allocation; anticipating and suggesting responses to risks and providing risk management advice.

2.3.3.2 ERP and IAF Role in Control Assurance

Internal control has been defined in several different ways in the accounting and organisational literature using such terms as "management controls", "organisational controls", "strategic controls", "operational

controls" and "financial controls", which all seem to revolve around the same concept (Rikhardsson et al. 2005). The internal control concept is defined by COSO (2011, p. 1) "As a process, affected by an entity's board of directors, management and other personnel, designed to provide reasonable assurance regarding the achievement of objectives in the following categories: Effectiveness and efficiency of operations, Reliability of financial reporting, and Compliance with applicable laws and regulations". In the context of corporate governance, the key is to ensure internal controls existing to address key risks. Management implements the controls, while internal auditors play an oversight role (Bailey et al. 2003).

COSO (2011, p. 5) defines the fundamental components of internal control:

- The control environment which is the atmosphere in which individuals conduct their control responsibilities.
- Risk assessment of the risks that have a negative impact on achieving organisation's objectives.
- Control process which helps ensure that management carries out the proper activities to address risks.
- Information on risk and control activities.
- Communication and monitoring.

This model addresses how the control environment resembles the basis of any monitoring activities and refers to the context in which this control is located and operates (Bostan and Grosu 2010). COSO (2011) suggests that internal auditors play a very important monitoring role in effective internal control.

The IAF's legitimacy strongly depends on its ability to monitor and improve internal control processes. Both monitoring and improving internal control processes are clearly referred to in the definition of internal auditing (IIA 1999). The internal auditor's role in internal control processes has become an important contribution to corporate governance. Sarens (2009) asserts that the IAF has a positive impact on the quality of internal control processes. Many (e.g. Spira and Page 2003; Matyjewicz and D'Arcangelo 2004; Fraser and Henry 2007) highlight

that internal auditors are responsible for identifying weaknesses in internal control systems. Internal auditors should identify internal control failures and provide recommendations to improve the effectiveness of the internal control structure.

Internal auditors provide assurance on the adequacy and effectiveness of controls. Cattrysse (2005) suggests that the assurance provided encompasses: organisation's governance activities; operation and information systems, integrity and reliability of operational and financial information; safeguarding of assets and efficiency and effectiveness of operations and compliance with regulations and laws. Hirth (2008) points out that an organisation with the best IAF generally has better controls. However, this does not by necessity mean that merely having an internal audit activity ensures good controls. Rather, an effective IAF creates a higher probability of better controls.

After ERP systems implementation, the control environment, systems and mechanisms of communication are changed. ERP systems become an enabling technology for internal auditors to maintain effective control over operations and provide assurance of reliable information. Madani (2009) points out that ERP comes with advanced control and audit features, while Chapman (1998) suggests that the objectives of the internal control function remain the same and only the mechanism of controls changes. Rikhardsson et al. (2005) suggest that ERP seems to affect the aim of the internal control regarding whether it should be based on preventive controls or detective controls and how these two should be mixed. Dechow and Mouritsen (2005) conclude that internal control is not reinvented with the implementation of ERP systems but becomes a collective affair including human actors and machine actors such as the ERP system itself. Dechow and Mouritsen conclude that ERP systems separate the internal control function from the management accounting function. Thus, control is no longer in the domain of the accounting department but a collective affair where ERP systems define the logic through which the control function is performed.

In the ERP environment, internal auditors should focus on assuring good control of the value-added activities. Glover et al. (1999) claim that most areas where ERP has the greatest impact on an organisation's competitive position are outside of finance; therefore, internal auditors have

to experience controlling the non-financial side of the business since they represent the greatest opportunity and the greatest risk. Information is increasingly becoming the basis for adding business value as well as having economic value. Therefore, Rikhardsson et al. (2005) suggest that the importance of controlling access and use of information is increased. Regarding the security control, She and Thuraisingham (2007) claim that internal auditors may have a greater role in deciding the degree of the security to trade off with cost, time and complexity of operations. Arnold and Sutton (2007) suggest that the controls of main concern are related to assurance of the completeness and validity of the transactions entered into the system. Internal auditors need to focus on the ERP system process to assure a robust security plan for internal controls in order to ensure complete, accurate, authorised and valid processing of all transactions.

In the ERP systems working environment, Bae and Ashcroft (2004) claim that the assurance of the reliability of internal controls is much more critical for ERP systems. This means that auditors may need to rely heavily on computer-assisted auditing techniques (CAAT). Lightle and Vallario (2003) claim that in ERP-based organisations, testing segregation of duties control is extremely challenging. They claim that auditors need new software tools to help them expedite the testing process; otherwise, their ability to assure controls would be compromised.

ERP systems delegate control, make it more impersonal and change the role and function of the accounting and auditing department (Rikhardsson et al. 2005). Chapman and Kihn (2009) propose that the full ERP automated integration of functions provides more transparency across the whole business process and makes individuals' actions visible as data entered in one place flows through to others and that flow could facilitate the internal control and internal audit.

2.4 ERP in the Accounting and Auditing Literature

Implementing ERP systems requires some modifications in the existing organisational structures and procedures as well as human capital portfolios. If the level of changes fits ERP requirements poorly,

then organisations will not realise the anticipated gains from the ERP. Redistribution of roles and responsibilities among groups can destroy an organisation, if it is not properly managed. Caglio (2003) finds that ERP systems implementation is an opportunity for groups to extend their knowledge basis, to reinforce their professional legitimacy and to augment their status within the organisation.

A quite distinct research agenda has been documenting various issues related to the introduction of ERP systems; however, the definition of tasks, the construction of roles and the meticulous segmentation of work are not given particular attention. Issues related to the nature of work transformations, which ERP systems impose, have been ignored in the literature. Kallinikos (2004) finds that the reconstruction of organisational functions, work duties and processes along lines that reflect the overall logic of ERP systems have only been mentioned in passing.

ERP systems influence the majority of functions in organisations (Rikhardsson et al. 2005). The organisational changes that occur through an ERP implementation have implications for accounting and controlling processes (Spathis and Constantinides 2004). With the ERP systems implementation, changes in staff relationships may take place. They may need to develop new working relationships, share information among departments, learn new skills and assume additional responsibilities (Grabski and Leech 2007). Therefore, the studies that investigated these issues in the managerial, financial accounting and auditing are analysed in the coming sections.

2.4.1 ERP Impact on Management Accounting

ERP systems are possible drivers of change with the potential to reshape management accounting. ERP systems pose both opportunities and threats for management accountants (Scapens 1998). ERP system's impact on management accounting has been studied from different perspectives including changes in the role of management accountants (e.g. Granlund and Malmi 2002; Granlund and Mouritsen 2003; Hyvönen 2003; Caglio 2003; Rom and Rohde 2004; Jack and Kholeif 2008; O'Mahony and Doran 2008; Sangster et al. 2009); changes in

management accounting methods (e.g. Granlund and Malmi 2002; Scapens and Jazayeri 2003; Lea 2007); changes in organising the management accounting function (e.g. Granlund and Malmi 2002; Hyvönen 2003; Quattrone and Hopper 2005) and the difference between the ERP and best of breed systems' impact on management accounting function (Hyvönen 2003).

Regarding the changing role of the management accountants, some (e.g. Booth et al. 2000; Granlund and Malmi 2002; Caglio 2003; Granlund and Mouritsen 2003; Hyvönen 2003; Scapens and Jazayeri 2003; Rom and Rohde 2004; Sangster et al. 2009; Grabski et al. 2011) suggest that ERP systems have little impact on management accounting, while others claim that the management accountant's role has evolved into business consultant (Caglio 2003; Rom and Rohde 2004). ERP systems have changed the management accountant's role through eliminating routine tasks (Chapman and Chua 2000) and increasing analytical tasks. On the other hand, Sangster et al. (2009) support the findings of Grabski et al. (2009) in the USA that a management accountant in an ERP environment needs a strong understanding of the business processes and significant IT skills. Their results confirm the findings of Grabski et al. that ERP systems implementation results in changes in the management accountants' role.

Moreover, O'Mahony and Doran (2008) assert that ERP is a valuable tool for assisting management accountants in fulfilling their core activities. However, the core responsibilities remain; there has been a shift in the role. ERP is a major catalyst to change the management accountants' role as Granlund and Mouritsen (2003) based on evidence from Finland conclude that the management accountants' roles are being redefined, although there is most likely no clear causal relation between IT and management accounting work. Overall, O'Mahony and Doran (2008) provide evidence that ERP has a positive effect on management accountants.

The results of Scapens and Jazayeri (2003) may conflict with Granlund and Malmi (2002) who find that management accounting tasks do not seem to be devolving to non-accountants. On the other hand, Newman and Westrup (2005) based on evidence from the UK show that neglecting the relationship of management accountants with

ERP systems allows other groups to wrest control from management accountants and make ERPs work in their own image.

Regarding the management accounting methods, Granlund and Malmi (2002) find that ERP system implementation does not influence the cost accounting logic, the decision to adopt activity-based budgeting or balanced scorecards. Scapens and Jazayeri (2003) confirm the results of Granlund and Malmi (2002) that no sophisticated management accounting techniques have been introduced following ERP systems implementation. The results obtained by Hyvönen (2003) in Finland confirm these results that there is no correlation between the adoption of ERP systems and the use of modern management accounting techniques. On the other hand, Booth et al. (2000) suggest that ERP systems provide the incentives for adopting activity-based budgeting and balanced scorecards.

Regarding the structure of the accounting function, Granlund and Malmi (2002) conclude that ERP systems implementation has caused just a few changes, while Caglio (2003) refers to the hybridisation of management accountants. Unlike Caglio (2003), Hyvönen et al. (2009) do not conclude that the IT infrastructure influenced the relationships among the professions in any way. They find that the hybridisation of management accounting is not related directly to IT systems, but more to the organisation's institutional logics. Management accountants' identities and legitimacy are at stake, and the combined pressures of business orientation and automation reduce the traditional accounting practice and emphasise interpretative work. Furthermore, Scapens and Jazayeri (2003) observe a widening of the role of the management accountants and, at the same time, a reduction in the size of the accounting function. This observation is in agreement with Chapman and Chua (2003) who find that both aspects of automation and integration in ERP systems reduce the need for employing management accountants.

Regarding the change in the management accounting function, a model of the impact of ERP systems on management accounting is developed by Granlund and Malmi (2002). They suggest that ERP systems have direct effects on changes in report content, timing and scheduling, while indirect effects result from management practice changes

and business processes change. They suggest that the overall effects of ERP systems in changing management accounting seem to be modest. They confirm that the ERP systems are more likely to have an impact on management accounting than vice versa. Supporting the findings of previous research (Granlund and Malmi 2002; Scapens and Jazayeri 2003), Hyvönen et al. (2009) conclude that while ERP systems have the ability to facilitate management accounting change, the willingness of management accountants to accept change is critical. The lack of flexibility in the management accounting function can be a risk since ERP systems offer a structured approach to functions which may not be appropriate for all organisations (Scapens et al. 1998).

Nevertheless, Scapens and Jazayeri (2003) explain that the changes are not the result of ERP system implementation. They view management accounting change as part of an evolutionary change process in which the ERP system implementation is one of the elements that opens certain opportunities and reinforces ongoing processes of change. It is not claimed that the ERP system is the driver of these changes; rather, it is argued that the ERP system's characteristics such as integration, standardisation and centralisation facilitate the changes and open up certain opportunities.

Regarding the management accounting skills, management accountants need to use a variety of skills to be an integral part of the management team (O'Mahony and Doran 2008). Since the role of the management accountant has changed, the type of skills needed has also changed. There is a need for a new set of skills to be able to use ERP systems. Many of the existing skills of management accountants are seen as redundant (Scapens et al. 1998; Newman and Westrup 2005).

Regarding the change of management accounting information, Scapens and Jazayeri (2003) assert that there has been a change in the use of management accounting information with forecasts giving a more forward-looking emphasis. Rom and Rohde (2006) confirm that ERP systems have no significant relationship to reporting and analysis or to budgeting and allocation of costs. Nevertheless, a significant positive relationship is found between ERP systems' data collection and organisational breadth of management accounting. Scapens and Jazayeri (2003) conclude that ERP systems can change the nature of functions,

generate new ones and cause some old ones to vanish. Additionally, they can change the relative importance of certain functions or departments.

This review illuminates different aspects of the relationship between ERP and management accounting. It can be concluded that the organisational practice is typically changed to fit the new technology. ERP has the ability to motivate functions adaptation or to threaten the legitimacy of others, and this applies to all functions of the business. ERP is a major catalyst for change in accounting functions. Neglecting the relationship between the IAF and ERP systems allows other groups to wrest control from other functions and make ERP work in their own image.

There is a need to expand the understanding of how work practices such as the IAF are adapted to new technologies. The theories and methodologies adopted in this AIS field tend to focus on institutional theory and qualitative empirical investigations. The issues of ERP systems in developing countries such as Egypt have been a neglected area of research in the accounting literature.

2.4.2 ERP Impact on Financial Accounting

The introduction of IT into accounting systems altered methods of data storage, retrieval and control (Majdalawieh and Zaghloul 2009). It has been acknowledged that the boundaries of accounting activities and practice are undergoing significant changes. The traditional view of accounting is being questioned by the diffusion of ERP systems (Caglio 2003). While some authors argue that accountants' traditional role is declining since accounting literacy has become easily transferable to others through ERP systems, others argue that accounting professionals are developing a broader role for themselves.

The impact of ERP systems on financial accounting has been studied from different angles. For example, the misalignment between ERP systems' embedded practice and the practice in use has been studied. There is misalignment between the accounting rules in practice and the accounting model embedded in the ERP system (Kholeif et al. 2007). Others focus on how accounting expertise changes with the implementation of ERP systems (e.g. El Sayed 2006). From

another side, Caglio (2003) explains the impact of the ERP system on accountants' practice and positions. Moreover, the impact of the ERP systems on accounting information has been studied by Colmenares (2009). Spathis and Constantinides (2004) investigate the changes in accounting processes brought in with ERP systems implementation. Moreover, the changes brought by the ERP system implementation to the accounting profession (e.g. Newman and Westrup 2005), accounting skills (e.g. Jean-Baptiste 2009), accountants' relationships with others (e.g. Caglio 2003; Bae and Ashcroft 2004), scope of services (e.g. Chapman and Chua 2000), accounting process (e.g. Spathis and Ananiadis 2005) have been studied.

For example, Kholeif et al. (2007) show that ERP system requires changing the procedures and documentation cycles between the organisation's departments. The results of Kholeif et al. (2007) are consistent with Granlund (2001) who describes the resistance that followed the implementation of an ERP system, which is explained as adherence to earlier procedures.

Newman and Westrup (2005) find that ERP systems are an arena that accountants take with enthusiasm and redefine their expertise. El Sayed (2006) confirms that the routine tasks of accountants' work are now carried out by IT and their working practices are affected by ERP. Thus, accountants' expertise is not being eroded but their expertise is being redefined. ElSayed finds that ERP systems result in losing control over the design of accounting systems and losing discretion in applying procedures for collecting and disseminating information. However, Caglio (2003) provides evidence that even if ERP systems have led accounting professionals to lose some control over their expertise and everyday activities, standardisation has legitimised a new role for accountants and has improved the overall perception of what value the accounting function creates. Caglio concludes that accountants have experienced a phenomenon of hybridisation with the ERP system implementation.

This review illuminates different aspects of the relation between ERP and financial accounting. It can be concluded that the boundaries of accounting practice and expertise are undergoing significant changes with the introduction of ERP systems. In some cases, resistance that

followed ERP systems introduction is explained as adherence to earlier models The externally imposed institutional pressures were used to resist requirements of adapting to ERP systems. In other cases, the changes brought by ERP systems have legitimised a new role for accountants and there has been an improvement in the overall perception of what value the accounting function creates.

The research in the field of the contemporary changes caused by ERP needs to broaden its consideration of the unit of study. There is a need to do more in-depth studies using a strong theoretical framework which is lacking in the field. The notable changes in accounting practice relate to the increased use of the IAF. There is a great need for more enterprise systems research in this area as the opportunities are abundant.

2.4.3 ERP Impact on Auditing

Auditors face a big problem regarding how to audit in the ERP systems environment as it is a very complex task (Sutton 2006). Internal controls are more difficult to assess for traditional auditors; therefore, ERP systems force auditors to reassess their audit models (Hunton et al. 2001, 2004). Auditors often audit around computers through just checking the input and output of information systems (Steven 1999; Cerullo and Cerullo 2000). Arnold and Sutton (2007) suggest that business processes and advanced IT are tightly coupled. Therefore, the days of auditing around the computer should have gone (Sutton 2000; Vasarhelyi and Greenstein 2003). While ERP systems are widely implemented, auditing has been slow to adapt to the latest changes (Vasarhelyi and Greenstein 2003).

Although ERP systems have been recognised as a huge change in the organisations' IT platform, few have been interested in the required change in auditing. There are different research streams regarding the audit change brought by ERP systems. These streams include: audit experience and skills (Brazel 2005; Arnold and Sutton 2007), the use of CAAT (Chang et al. 2008; Gehrke 2010), continuous auditing (CA) (Vasarhelyi et al. 2004; Debreceny et al. 2005; Alles et al. 2006, 2008; Kuhn and Sutton 2006; Saharia et al. 2008) and internal audit change (Madani 2009).

2.4.3.1 ERP and Audit Experience

Some studies have been interested in the impact of ERP systems implementation on the external auditors' experiences. For example, Brazel (2005) discusses developing a measure for auditors' expertise in ERP systems, while Debreceny et al. (2005) note that extensive auditors' knowledge of ERP programming languages is required. As a result, Arnold and Sutton (2007) are concerned with the needed change in the auditing education.

2.4.3.2 ERP and the Use of the CAATS

Some studies have been interested in developing technical audit tools to help auditing in the ERP systems work environment. For example, Chang et al. (2008) develop an auditing system for the Oracle ERP system. Their approach differs from Gehrke (2010) who designs software (AuditLab) independent of a specific ERP system. Others have developed approaches to automate audit reports preparation (Wahdan et al. 2005). Vasarhelyi et al. (2004) claim that these approaches are limited as they do not fully benefit from the new technological capability to automate and integrate various audit processes. In addition, they do not sufficiently respond to the new challenges of auditing modern organisations. Therefore, Vasarhelyi et al. (2004) claim that routine auditing tasks can be done comprehensively and cost-effectively through CA systems and through utilising ERP systems' automation and integration. However, there are few known about integration aspects between organisations' system and the auditors' system.

2.4.3.3 ERP and Continuous Auditing

Continuous auditing is a real-time auditing and reporting approach (Bierstaker et al. 2001). Continuous auditing is a type of auditing by exception as the processes are considered to be correct until alarm states otherwise (Vasarhelyi et al. 2004). Two main methodologies are used to approach CA in ERP systems environments: embedded audit

module (Groomer and Murthy 1989) and monitoring control layer (Vasarhelyi et al. 2004). Previous research efforts offer evidence of the viability of monitoring control layer CA approach in an ERP environment (Alles et al. 2006, 2008; Kuhn and Sutton 2006). Continuous auditing tools are rapidly becoming a key component of overall corporate governance efforts (Kuhn and Sutton 2010). Vasarhelyi et al. (2004) confirm that CA would be built on an existing ERP system; therefore, organisations which have reached full functionality using ERP systems would be the first to deploy CA systems. In the same vein, Debreceny et al. (2005) claim that ERP systems embed query tools which provide a range of embedded audit module functionality. Kuhn and Sutton (2010) elaborate on Debreceny et al. (2005) and make a comparison of characteristics for a variety of continuous auditing application design approaches.

It was not anticipated by Alles et al. (2002) prior to SOX that it will be internal not external auditors who are the main champions of CA. Internal auditors see in CA a way of reducing the personnel needed to do their existing tasks. In addition, SOX Section 201 strengthened the independence standards on external auditors and there was great concern that CA would violate it, while internal auditors faced no such restrictions. Moreover, Alles et al. (2008) suggest that the definition of CA would have to place more emphasis on the role of internal auditors.

2.4.3.4 ERP and Internal Audit

IT is very much integrated into the internal auditors' function, and internal auditors are very interested in their organisations' IT operations and infrastructure (Jackson 2008). Internal auditors should use IT appropriately to assure that data captured precisely and completely reflect economic events which have implications for financial information reliability (Dowling 2009). While what is good for an organisation from an IT perspective, in most cases, is not good for internal auditors because organisational IT priorities and internal audit IT priorities are not often the same. Internal auditors have their own IT priorities as

they have a critical perspective on the complexities of IT risk management and auditing (Jackson 2008).

In the ERP-integrated business environment, the need for confirmed assurance of internal control and financial information shifts interest to the IAF. These systems have the potential to greatly influence internal audit structure and practice. In the ERP systems environment, Tryfonas and Kearney (2008) claim that internal auditing is laborious and there is a requirement for automating audit tasks. The complexity of an organisation's IT infrastructure constitutes a tricky task to tackle by auditors (Majdalawieh and Zaghloul 2009).

According to Majdalawieh and Zaghloul (2009), the IAF has changed dramatically over the years and is still evolving as a reflection of the developments and changes in the technology. Bae and Ashcroft (2004) suggest that switching to real-time reporting via ERP systems is a tremendous change that has affected the role of internal auditors for which they need to be well prepared.

The belief that change in the internal audit is an essential part of the means to achieve good corporate governance, and is developing among scholars and practitioners alike; however, there is no common understanding yet developed of how such change could be achieved. Vasarhelyi et al. (2004) claim that internal audit does not sufficiently respond to the new challenges of auditing in modern organisations. There is disagreement concerning the best structure of the internal audit department as well as concerning the nature of the collaboration between internal auditors and IT auditors. Moreover, Marks and Taylor (2009) suggest that internal auditors cannot and should not abdicate the evaluation of all technology-related areas to IT auditors.

There is a debate concerning the viability of the traditional internal auditing after ERP systems implementation (e.g. Glover et al. 1999; Saharia et al. 2008; Madani 2009); however, what ERP systems require of professional groups such as internal auditors is still not clear (Caglio and Newman 1999). For example, Madani (2009) suggests that the IAF needs to be seen in a wider context. It needs to be redefined in terms of focus, scope and range of services. Sutton (2006) suggests that ERP systems have fundamentally reshaped information processing which makes

major changes in the overall focus of the IAF. Saharia et al. (2008) suggest that internal auditors should acquire enough knowledge to understand how the ERP system works. While Colmenares (2009) claims that the ERP systems make the process of planning and carrying out auditing easy and increase its reliability; Hunton et al. (2004) suggest that there are significant unresolved issues facing the internal audit profession.

ERP systems force auditors to reassess their audit models. It is clear that the area of ERP systems' impact on the auditing profession lacks enough research inquiry compared with other accounting disciples. Moreover, despite the fact that there are few research studies in auditing, most of these studies are orientated towards external auditing, are non-empirical and do not use any theoretical lens. There have been many calls for more research to address the nature of the internal auditing needed changes. The belief that IAF adaptation is an essential ingredient to achieve good corporate governance in the ERP systems environment is increasing among scholars and practitioners alike. However, there is no common understanding yet developed as of how such change could be achieved.

2.5 Conclusion

Increasing public interest in corporate governance has driven organisations to review their expectations of IAF. ERP systems act as a catalyst for change in the IAF. The internal auditing practices are social constructions, where consensus is essential before something can be counted as legitimate practice in the professional system. The motivation for this book was the conviction that the changes in the IAF, as a response to ERP implementation, have not received the attention in academic research that their significance merits. In particular, it can be argued that attempts to establish new claims to knowledge provide valuable opportunities to study the processes through which such claims are linked with attempts to expand and maintain the legitimacy of professional jurisdiction.

Internal auditing is the outcome of a complex conjunction of external and internal associated constituents. It is these connected elements

that justify a function-level approach to the analysis of internal audit change. As it has been made clear, internal audit change is not a simple, one-sided response but is actively implicated in interventions. So the view that aspects of the regulatory process in internal auditing serve as mere constraints on professional practice has been challenged, calling for recognition to be given to their capabilities to facilitate the mobility of professional practice by legitimising the new internal audit structure and practice in the new technological environment. This book addresses the gaps in the literature regarding the internal auditing adaptations as a response to ERP systems implementation in one of the developing countries where there is growing attention to the corporate governance process and a diffusion of ERP systems.

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3

The Legitimacy of Internal Auditing Practice

3.1 Introduction

The legitimacy of the accounting practice and audit profession, in general, resides substantially in the governance frame in which audit requirements are embedded and in the claims that legitimate the whole profession. These are the engagement of audit expertise and practice with dominant values such as rationality and effectiveness (Abbott 1988). Literature exists on the role of accounting and audit in producing legitimacy in organisations and society (e.g. Power 2003), but much less has been written about gaining and maintaining the legitimacy of audit practice themselves.

Few studies have been concerned with the legitimacy of accounting practice and external audit methodologies. In regard to accounting techniques, Georgiou and Jack (2011) using theories of legitimisation find that historic cost accounting (HCA) only enjoyed an episodic legitimacy and the principles of Fair Value Accounting have been legitimised only to some extent. Greenwood et al. (2002) examine the role of professional accounting associations in a changing, highly institutionalised organisational field and suggest that they play a significant role in legitimating change.

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In regard to external audit, Power (2003) suggests that the legitimacy of both auditor and auditees is co-produced. Robson et al. (2007) focus on the organisational field of audit firms, where educational institutions constitute a source of normative legitimacy. They assert that in order to distribute business risk audit methodologies, audit firms have to seek legitimacy in the institutional environment. This, in turn, involves redefining knowledge within a complex of professional, regulatory, cultural and academic, environments (Abbott 1988; Suchman 1995). Although these studies did not look at the legitimacy of internal auditing, the concepts they cover can be extended to the internal audit function and offer a roadmap for the current book.

From the literature review, it can be seen that very little has been written about the legitimacy of the contemporary internal audit. Prior research has focused on the achievement of professional characteristics as an indicator of the degree professionalism of the internal audit. In contrast to international trends, according to which the IAF derives its legitimacy from pursuing a new role in operational control, risk management and corporate governance (IIA 1999; Spira and Page 2003), Arena and Jeppeson (2010) find that Danish internal auditors derive their legitimacy mainly as assistants to the external auditors.

While the concept of legitimacy is a familiar construct in institutional theory (Meyer and Rowan 1977; DiMaggio and Powell 1991; Suchman 1995), the emphasis in this book is on contributing to an understanding of internal audit change and adaptation by highlighting internal audit legitimacy in the context of ERP-based organisations. Of particular relevance is how claims to new audit knowledge, practice and structure are articulated. The legitimacy of the profession rests in part upon an acceptance that individuals and organisations are rational and knowledgeable.

This chapter critically analyses the literature on legitimacy in the accounting and auditing in order to offer an understanding of the concept and how it can be studied. Significant gaps in the accounting and auditing literature are addressed, and the main issue under study is stated. The institutional theoretical lens that is used to study the phenomenon is explained and justified through reviewing the relevant studies in the area. Finally, the conclusion of the chapter is outlined.

3.2 The IAF Practice and Structure Aspects

As a result of the continually changing business environment, the internal audit faces rapidly evolving requirements to which it must respond effectively (Kagermann et al. 2008). With the emphasis on risk management and control assurance as integral aspects of corporate governance, changes have taken place in the internal audit profession's roles, practice and structure with increasing pressures to undertake a variety of duties and accept responsibilities outside the traditional boundaries of its role (Selim et al. 2009). As a response to the multiple pressures on the internal audit profession, internal audit professionals have been drawing attention to changes which "create value" as a matter of survival (Bou-Raad 2000; Sarens and De Beelde 2006). The ultimate challenge for internal auditors is to provide the degree of reasonable assurance expected by all the stakeholders since they are the key enablers in the corporate governance process (Cattrysse 2005). According to PricewaterhouseCoopers (PwC) (2009, p 9), successful internal audit departments "will be those maintain alignment with the changing risk profile of their company and the evolving needs and expectations of their key stakeholders".

The IAF has changed considerably over the years as it has moved from being viewed as a corporate watchdog to being a mechanism to keep an eye on compliance with organisation's policies and procedures, to enhance a more preventive proactive role with a strong focus on risk management and continuous business performance improvement. Currently, technology is changing the complexity of the internal auditing environment (Majdalawieh and Zaghloul 2009).

In the ERP environment, the IAF needs to change in order to be able to retain its role in adding value through enhancing the corporate governance activities, especially the internal control assurance and the risk assessment. The IAF change may encompass many aspects such as structure, practice and relations with others. As a consequence of the diffusion of ERP systems, Caglio (2003) provides evidence that there is a new phenomenon of the extension in the set of practice and legitimated competencies which constitute the domain of a specific functional expertise.

Internal auditors are struggling to catch up on a changing world. Currently, they are facing career challenges and opportunities in the new dynamic marketplace. They have to keep their knowledge up to date in accounting, technology and regulatory and legislative changes. They are called upon to protect their organisations from different kinds of risks as their role in the governance process is an increasing role (Marshall and Magliozzi 2009).

The literature shows that there are some specialists who are interested in analysing the internal audit's development (Mautz et al. 1984; Dittenhofer 2001; Nagy and Cenker 2002; Carcello et al. 2005; Allegrini et al. 2006; Sarens and De Beelde 2006; Robson et al. 2007; Head 2009; Marks and Taylor 2009; Selim et al. 2009). For example, to document the IAF change as a response to the turns in global business practice, Allegrini et al. (2006) review internal audit literature in Europe. Changes in the internal auditors' activities have been confirmed. Opportunities and challenges for internal auditors have resulted from several factors in Europe such as advances in IT and a more dynamic regulatory environment. The IAF should be adaptable and creative as organisations now operate in rapidly changing environments, which require real-time responses to real-time issues. Failing to be equipped to respond to new challenges will lead inevitably to legitimacy problems.

Previous studies have tried to determine appropriate criteria to evaluate the effectiveness of the IAF. Though several studies ascertain the need to measure internal audit effectiveness (e.g. Mihret and Yismaw 2007), there is no generally accepted standard measure for this purpose. Gramling et al. (2004) suggested that an effective IAF can be acknowledged only if the IAF quality has a positive impact on the quality of corporate governance. Arena and Azzone (2009) study organisational drivers of internal audit effectiveness in the light of recent changes in the internal audit's mission and its central role in corporate governance. The results have showed that internal audit effectiveness is influenced by the characteristics of the internal audit team, the internal audit activities and processes and the organisational links.

As a result of the continuous change that the internal audit profession has to cope with, it is apparent that research frameworks have to be updated and refined regularly (Sarens and De Beelde 2006). The

complication of business activities, systems and processes has considerably increased in organisations. Marks and Taylor (2009) confirm that like never before, internal audit's focus must be aligned with priorities in the business to remain relevant and legitimate. Head (2009) confirms that current economic issues facing the internal audit cause internal auditing change. Internal auditors have to understand which business norms have changed in order to adapt to the current economic and regulatory environment.

3.2.1 Scope of Services and Practice

In the COSO model, "the scope of internal audit should encompass the examination and evaluation of the adequacy and effectiveness of the organization's system of internal control and the quality of the performance in carrying out assigned responsibilities" (COSO 2011, p. 138). Over the last few years, the internal audit role and scope of services have been expanded to involve more activities so that the IAF no longer has a narrow focus based on evaluating and strengthening internal controls (Cohen et al. 2004; Gramling et al. 2004). The traditional internal audit was focused on compliance, monitoring, examining the performance of line managers, while the new internal audit focuses on improving corporate performance, links to risk management and helps managers understand what could prevent from achieving expected goals (Bou-Raad 2000; COSO 2004; Matyjewicz and D'Arcangelo 2004).

Previous studies have outlined that the internal audit profession experiences radical shifts that internal audit is both an assurance and a consulting activity, playing a key role in corporate governance and risk management. Empirical evidence in the USA and Australia supports this change (Nagy and Cenker 2002; Cooper et al. 2006; Hass et al. 2006; Burnaby and Hass 2009). In Europe, internal audit activities have increasingly been focused on consulting, governance, IT and management audits, while resources used for compliance and financial audits have been reduced (Paape et al. 2003; Allegrini et al. 2006). Kagermann et al. (2008) suggest that the internal audit's orientation has shifted towards value-adding services and away from the traditional assurance services. Burnaby and Hass (2009) suggest that less time will

be spent on operational audits, review of financial processes and regulatory compliance audits. In order to improve the added value of internal auditors' practice, Arena and Azzone (2009) suggest that they have the opportunity to increase their involvement in activities which support the risk management process and to provide recommendations for improvements to vital systems, processes and procedures.

PwC (2007) identifies that technology and the changing role of internal audit will have a strong impact on the IAF in the coming years. It is essential to understand these trends and their implications, so that internal audit can provide added value to the organisation; Selim et al. (2009) state that little subsequent research has been undertaken. In addition, only a small number of research studies have addressed the changing activities of the internal auditors and there have been significant changes in the internal audit environment since these (Munro and Stewart 2010), especially the changing activities of the internal auditors in the ERP working environment.

3.2.2 Internal Audit Structure

PwC (2009) State of the Internal Audit Profession study recommends that special attention should be focussed on developing audit departments where IT skills are embedded within the department rather than just being the domain of the IT audit subgroup. Marks and Taylor (2009) suggest that this integration may not be occurring in many organisations and continuous focus in this area is still needed. Sumners and Soileou (2008) suggest that by means of a rotation between IT staff and internal auditors training of IT audit personnel regarding critical systems concerns and significant knowledge transfer can be achieved; however, one main consideration is the limitation of independence and objectivity as a result of prior work performed and relationships built.

3.2.3 Internal Audit Skills

Consistently with the evolution that currently takes place in the role of internal audit within organisations, Arena and Azzone (2009) suggest

that internal audit professional bodies should redesign the skills and competencies sets needed for their profession. The internal audit profession should develop the necessary talent to maintain an effective value-added audit activity (Sumners and Soileou 2008). The PwC survey (2009) unfortunately reveals that most internal auditors are not prepared for auditing in an automated environment and finds that internal auditors are still struggling with a skills gap in technology.

According to the capabilities and needs survey of internal audit professionals, Marshall and Magliozzi (2009) find that the greatest technical skill area needing improvement was information security. Abdolmohammadi and Boss (2010) call for an additional investigation to determine the most effective training material, skills and knowledge in order to adequately prepare technology-oriented internal auditors to be more familiar with technology and IT audits. IT audit skills are essential because internal auditors who traditionally carry out operational, financial and compliance audits of their organisations, may also need to be IT professionals who must be "*skilled in the implementation, operation, and maintenance of IT systems in an organization*" (Merhout and Buchman 2007, p. 470). Therefore, Sarens (2009) suggests that a major challenge for future research is to come up with an internal auditor profile that matches the needs of an IAF that plays a value-adding role in monitoring and improving risk management and internal control processes.

3.2.4 Internal Audit Tools

The ability to perform more highly effective work using fewer resources is dependent on having the right tools and using them effectively. Advanced technology enables internal auditors to change the way of doing their work. They should understand these developments and take advantage of them when appropriate (Marks and Taylor 2009).

Given the wide adoption of complex IT such as ERP systems by many organisations, Abdolmohammadi and Boss (2010) claim that the effectiveness of assuring good internal controls and the assessment of risk management require an increasing use of IT audit techniques.

Burnaby and Hass (2009) show that in the near future a greater number of internal auditors will extensively use risk-based audit planning; CAATs; process modelling software; and continuous real-time auditing and data mining.

Researchers in auditing have explored different ways of IT tools (Searcy 2003). The approaches that have been proposed are classified into two major approaches: developing useful CAATs and implementing the concept of CA (Ling-yu Choua et al. 2007). Alles et al. (2008) claim that the main champion of CA is internal rather than external auditors. This is because of two reasons. First, the external auditor has no time for developing new CA methodologies, while internal auditors see in CA a means of reducing the demands of their existing tasks. Second, SOX Section 201 reinforces the independence standards on external auditors and CA would violate these restrictions, while internal auditors obviously do not face such constraints. In the same vein, Majdalawieh and Zaghloul's (2009) survey results have indicated that 89% of the respondents agreed that there is a need for implementing internal CA, while only 38% agreed that there is a need for implementing external CA. CA can utilise the ERP systems' technological capability to achieve more efficient, effective and timely internal audits (Alles et al. 2006). Vasarhelyi et al. (2004) have predicted that the most suitable environments to implement CA are ERP-based organisations where CA would be built on an existing ERP system.

Marks and Taylor (2009) suggest that internal auditors should take advantage of new technological developments when appropriate, especially, in areas where IT can and currently is being used in by internal audit process such as risk assessment, data analytics, continuous data and control auditing, process and control documentation, automated testing, IT security and privacy, access control and segregation of duties monitoring, technical IT auditing, reporting and governance and risk and compliance.

According to Sarens (2009), although the auditing tools and techniques in use determine the effectiveness of the internal auditing activities, they have been explored to only a limited extent by researchers. According to Burnaby and Hass (2009), while internal auditors are required to continuously learn new audit tools and technologies to

meet their expanded activities, there is very little information in existing internal auditing literature on the current state of requirements for tools and technologies.

3.2.5 Internal Audit Sourcing

Organisations may use their ownstaff (in-house), use an external organisation (outsource) or a combination of the two (co-source). Depending upon priorities and availability of resources, some audits or audit skills may be outsourced (Burnaby and Hass 2009). Glover et al. (2008) and Smith (2000) claim that failure to really change the IAF led to outsourcing it to the external auditors. Internal audit departments which survived have lost many of their specialists in financial and computer auditing to external auditors recruiting to carry out their new business.

Munro and Stewart (2010) assert that outsourced internal audit offers high-quality services and may have a greater level of expertise, especially with regard to specialist knowledge such as technology skills. Furthermore, Sumners and Soileou (2008) claim that outsourcing and co-sourcing may provide benefits such as reduced cost and flexibility in staffing levels. In addition, the use of an outsourced internal audit may provide specialised skills in systems security expertise.

The IIA maintains a preference for in-house internal auditing suggesting that a competent in-house internal audit "can perform the internal auditing function more efficiently and effectively than a contracted audit service" (IIA 1994, p. 2). This reflects that outside providers lack the in-depth organisation knowledge possessed by in-house internal auditors. Coram et al. (2008) find that organisations which rely solely on an outsourced IAF are less likely to detect and self-report fraud than those undertaking at least part of their IAF themselves. Findings suggest that keeping the IAF within the organisation is more effective than completely outsourcing that function.

Financial crisis and financial scandals have led to an increase in the level of investigation. Kwon and Banks (2004) suggest that one of the most significant causes of such giant failures was the outsourcing of the internal audit activity. These events have discouraged the outsourcing of

the IAF and increased the importance of internal auditors as organisations face an increased regulatory environment.

In the ERP-based organisation, Glover et al. (1999) suggest that the IAF is better served if it uses the outsourced specialists to carry out the complex technology issues that only need to be handled periodically. Trying to become technological experts is rarely the most effective way to utilise internal auditors' resources. Abdolmohammadi and Boss (2010) suggest that if the IAF possesses skills, it is likely to perform IT audits. If it does not, then the IT audit may be performed by other departments or may be co-sourced or completely outsourced.

3.2.6 Relations with IT Department

Attention should be paid to the internal audit relationships within the organisation, since these can influence its effectiveness. The importance of the proper positioning of the internal audit is a topic which has been debated by many (e.g. Arena and Azzone 2009). Recently, an important relationship that may affect the internal audit position within organisations, and which attracts the attention of many authors, is the internal audit relationship with the IT department (Allen 2008; Marks and Taylor 2009; Lewis 2010). For example, Allen (2008) suggests that the internal audit department should work closely with the IT department. The internal audit and IT departments have related business missions, but they can face conflicting responsibilities. As corporate government regulations for data management and security have been tightened, the IT department must safeguard data from violations, fraud, control gaps, inappropriate access and infringements of information privacy . At the same time, the internal audit department needs quick, seamless access to data in order to be able to examine complete data sets to provide better assurance. It is a considerable problem between those who need the data for business insight and those whose job is to manage the data (Lewis 2010). Sumners and Soileou (2008) suggest that there are some questions which need to be answered about how the internal auditors' interaction with the IT department changes after ERP system implementation.

3.2.7 Internal Audit Team Size

Issues raised by corporate scandals and the financial crisis have forced internal audit departments to reevaluate internal audit staffing levels to ensure adequate coverage (Sumners and Soileou 2008). The size of the internal audit team clearly determines the time dedicated to auditing activities. Furthermore, the size of the internal audit team is one of the key criteria used by external auditors to evaluate its quality (Al-Twaijry et al. 2004; Mat Zain et al. 2006). Abdolmohammadi and Boss (2010) suggest that to engage in more IT audits, either the size of the internal audit department must increase or the IT audits may have to be dealt with other types of IAF activities such as operational audits. The exact nature of these changes requires further research.

3.2.8 Internal Audit Budget

The increasing cost of the internal audit has become unavoidable in most organisations as a result of its importance as an effective corporate governance mechanism. Head (2009) suggests that while running the IAF has numerous cost components, the largest portion of its budget is for professional resources. Therefore, many IAFs are challenged to justify their value in terms of savings and cost recovery.

The IAF's budget can be related to many factors. For example, Carcello et al. (2005) find that the internal audit budgets were positively related to the financial services industry and companies face a higher risk. Petter et al. (2008) claim that the significant internal audit cost is related to the complexity of recent IT, where organisations have increased their investments in IT over the past decade. Additionally, Abdolmohammadi and Boss (2010) suggest that the significance of the budget of the IAF to organisations is related to the complexity of the IT.

To evaluate the impact of the global economic and financial crisis on internal audit activities, the IIA Research Foundation (IIARF) has examined the impact of the economic crisis on the internal audit activity and its budgets. Although 41% of respondents stated that

their budgets have stayed about the same, 51% stated that their budgets have decreased anywhere from less than 10% to more than 50% (IIA 2009). This means that there is more pressure to improve the IAF and at the same time reduce its budget and justify that its added value exceeds its cost.

3.2.9 Relation with External Auditor

The current governance environment increasingly emphasises the relationship between internal and external auditors (Gramling et al. 2004). Additionally, the economic benefits of external auditors' reliance on internal audit work are well acknowledged (Glover et al. 2008). International standards of auditing (ISA) 610 require external auditors to consider objectivity, technical competence, due professional care and communication when deciding whether internal audit work is adequate for the purpose of their audit (ISA 610 2009).

External auditors' decisions about reliance have been the focus of a large body of research. Factors which have been explored include the level of coordination between the internal and external audit (Felix et al. 2001), internal audit sourcing arrangements (Glover et al. 2008), client pressure to use internal audit services (Felix et al. 2001), internal auditors' competencies (Felix et al. 2001; Al-Twaijry et al. 2004) and the size of an internal audit team (Al-Twaijry et al. 2004; Mat Zain et al. 2006). Gramling et al. (2004) have reported that the majority of the research on internal audit effectiveness has been focused on the perceptions of the external auditor and whether the external auditor uses the internal auditor's work, while Zain et al. (2006) find that internal auditors' assessments of their own contribution to the external audit are related to competence and involvement in the IAF as well as internal audit size, staff experience, availability and closeness to the external auditors. Changes in the internal audit are likely to impact external auditors' decisions on reliance (Munro and Stewart 2010), especially internal auditors' reliance on the IT in the ERP working environment, an issue not addressed in prior research.

3.3 Gap in Accounting and Auditing Knowledge

A lot has been written about ERP systems in the professional auditing and computing literature; however, comparatively little attention has been given to the internal audit adaptation as a response to ERP implementation. This may seem surprising as such systems are claimed to have significant implications for internal auditing. The above discussion indicates that to date there is an emerging and growing interest in this issue (e.g. Spathis and Constantinides 2004; Kanellou and Spathis 2011, 2013). However, no clear indications have been revealed of how ERP implementation affects the IAF and the insights gained to date have a number of limitations.

Previous studies investigating the relationship between the IAF and governance remain very few. There is a scarcity in the studies that addressed the governance pressures to maintain an updated IAF in the organisational and sub-organisational level. Only Arena et al. (2006) and Al-Twaijry et al. (2003) address this issue on the country and organisational field level. Therefore, there is an opportunity to contribute in the organisation or the sub-organisation level.

Many studies suggest that ERP systems raise the issue of corporate governance. However, most of these studies focus on the impact of corporate governance on the ERP systems' implementation (e.g. Carroll and Fitz-Gerald 2005), while others (e.g. Chen 2009; Grabski et al. 2011; Chen et al. 2012) suggest that ERP systems should be considered as a part of corporate governance systems, where there are many research opportunities. Therefore, the current book is interested in addressing the impact of ERP systems on corporate governance mechanisms.

There have been no previous studies that address the change in internal auditing as a response to ERP system implementation (Kanellou and Spathis 2013). Abdolmohammadi and Boss (2010) suggest that a point awaiting further investigation is to identify the most effective skills, knowledge and training material to adequately prepare technology-oriented internal auditors. Only very few exploratory studies give

even general insights about the expected impacts of the introduction of ERP systems on a few aspects of the IAF. For example, Saharia et al. (2008) conduct a survey to examine internal auditors' ability to identify and manage risks in the ERP environment. Studies which simply aim at identifying the ERP systems impact using surveys are not able to identify the nature and complexities of the adaptation. Moreover, most of the ERP studies that have been reviewed were based on non-empirical research (e.g. Vasarhelyi et al. 2004; Arnold and Sutton 2007; Tryfonas and Kearney 2008; Madani 2009; Kuhn and Sutton 2010; Kanellou and Spathis 2011, 2013). Sarens et al. (2011) suggest that there are research opportunities to evaluate whether the traditional internal audit activities are still sufficient to meet the current needs of organisations. Therefore, there is a need to conduct an in-depth empirical study to investigate this issue.

Most researchers have focused on addressing the changes in external auditing, while very little research has been driven by the internal audit view (Abdolmohammadi and Boss 2010). Although most of CA research has focused on the external audit, opportunities exist to broaden research in the internal auditing domain. Wright and Wright (2002) suggest that research is needed to provide evidence regarding the costs and benefits of the methods employed by internal auditors in gaining assurance on the reliability and sufficiency of ERP system controls. Kuhn and Sutton (2010) suggest that there are some questions that need to be answered.

While it is broadly accepted that there is a lot to gain from trying to understand accounting in its social context (Hopwood and Miller 1994), auditing research has stayed away from trying to be understood in its social context, particularly in terms of contemporary audit practice (Robson et al. 2007). Prior research suffers from either not using an analytical framework or focusing on only one aspect of ERP impacts on internal auditing changes. Few studies have been carried out to investigate the relationship between the theory and the contemporary practice of internal auditing in the highly technological work environment. This lack of research is the case in the developed countries, so there is no doubt that the situation is worse in the developing countries.

Previous studies ignore the fact that ERP built-in best practice, including internal control practice, is derived from companies operating

in developed countries. Therefore, a best practice developed in other contexts may not be appropriate for use in developing countries. Most of the studies regarding the IAF and ERP systems have taken place in developed countries such as the USA and the UK (Kholeif et al. 2007; Ebaid 2011); while ignoring the contexts of developing countries, where there is growing attention to corporate governance and a diffusion of ERP systems. There have been no previous studies that address ERP impacts on the internal auditing adaptation in the contexts of less developed countries. This book is unique as the empirical part of the book is carried out in organisations operating in one of the developing countries, namely Egypt. This is one of the first studies to investigate internal auditing adaptation for the introduction of ERPs in organisations operating in the developing countries.

Banks are widely acknowledged to heavily depend on IT (Chowdhury 2003), and the IAFs with the longest history are found in the banking sector (Sarens et al. 2011). According to Fuß et al. (2007), although banks may represent an important customer for ERP systems, no previous academic research has dealt with ERP usage in banks. None of the past studies looking at the ERP's impact on auditing have been conducted in banks.

Finally, previous studies acknowledged the levels of analysis existing in institutional theory: field, organisation, sub-organisation and individual. However, while studies at the organisational level of analysis form the majority of studies, there is room for IT contributions at organisational sub-system levels of analysis such as groups, departments and processes (Mignerat and Rivard 2005); this matter will be explained more in Sect. 2.8. Therefore, institutional studies of the impact of IT implementation on professional groups (internal auditors) within the organisation would possibly contribute to both research and practice.

The IAF adaptation after ERP systems implementation is an under-researched area that requires more attention (Grabski et al. 2011; Kanellou and Spathis 2011; Nwankpa and Datta 2012; Kanellou and Spathis 2013). Moreover, Grabski et al. (2011) suggest that there is a lack of a strong theoretical base in ERP studies. However, there are different levels of analysis in research on ERP systems offering interesting new insights. Mignerat and Rivard (2009) suggest that there is room

for contributions at sub-organisational levels such as groups, departments and functions. Calls for further research include Madani (2009), who suggests that there is a need for studies to address the IAF redefinition in terms of focus, scope and range of services in alliance with other appraisal functions. This book would help in gaining insights into the new roles and functions of internal auditors and assessing the position of internal auditors among various associated groups. It helps in identifying how ERP systems change the internal auditors' role by identifying the internal auditors' role in the design and implementation stages of the applied control mechanisms and solutions. In addition, Madani (2009) suggests that there is a need for researchers to study the skills, knowledge, capabilities and experience that internal auditors must have in order to fulfil their roles and functions in ERP-based organisations.

Orlikowski and Barley (2001) suggest that transformations in the nature and organisation of work cannot be understood without considering both the technological changes and the institutional contexts that are restructuring organisational activity. Studying the nature of change is needed; therefore, this book seeks to explore in depth the processes of change and the nature of the adaptation of the IAF, which followed the recent introduction of ERP systems in certain organisations.

Caglio (2003) and Scapens and Jazayeri (2003) relate the impact of ERP to the transformation of the roles of management accountants. This strand of literature has assumed nonlinear explanations that do not accept simplistic notions of cause and effect. How ERP systems affect other professional groups such as internal auditors needs similar detailed exploration. In addressing the evolution of internal auditors' change, it can be argued that ERP systems are a fundamental catalyst for such a phenomenon. It is not necessarily claiming that ERP implementation is the driver of internal auditing change. ERP systems could be said to facilitate the change, rather than being the change driver.

It seems that no research has drawn upon interpretive case study strategy in order to study the implications for the IAF arising from the introduction of an ERP system within a specific socio-organisational context. This book is expected to fill a gap that exists in previous research related to corporate governance and ERP systems. Two main aims are central to this book: first, to produce a theoretical

understanding to clarify the nature of the IAF adaptation as a response to the ERP system implementation and to clarify the impact of this change on the internal audit's effectiveness in performing corporate governance-related activities; second, to provide detailed empirical evidence and some suggestions to internal auditors by means of an in-depth case study. This book addresses the present gaps in the literature by investigating how ERP systems motivate adaptation in the IAF to maintain a role that is acceptable to its stakeholders. The book overarching issue is:

> *How does the IAF respond to the external governance pressures and the internal ERP systems' logic pressures in order to maintain its legitimacy as a governance mechanism?*

This book opens the door for further discussion about the ways of developing standards for the profession that can be accepted and complied with ERP-based organisations worldwide. The internal audit is considered an evolved international profession. Therefore, there should be a common agreement among internal audit practitioners on what is expected from them and the aims of their profession after ERP introduction. It is important to note that a global standard of internal auditing could not be developed by legislation but rather by research and investigation into ways to develop through reasoning and intellectual persuasion.

3.4 Institutional Theoretical Lens

To achieve this book aim, a theoretical framework is required to interpret the impacts of ERP technologies on the IAF in the corporate governance environment. Institutional theory was found to be a suitable theoretical lens as the book focuses on translating ERP-inscribed logic in the organisational context where governance institutional arrangements related to the IAF exist. Contemporary institutional theory is employed to examine systems ranging from micro-interactions to macro-frameworks (Scott 2008).

Materialistic theories face some difficulties in explaining the relation between technology and the associated structures, such as why similar IT is often associated with different organisational structures and why identical structures often surround widely divergent IT (Barley 1986). For example, contingency theory's (Burns and Stalker 1961) vision is mainly static since most researchers merely correlate technological attributes with selected characteristics of formal structure. Therefore, contingency theory tends to ignore human actions. In order to gain a more adequate understanding of how technology and organisational structure are related, attention to social dynamics and human action is required (Barley 1990). Although structuration theory (Giddens 1984) offers a framework for studying technology in a social context, it provides few analytical tools for explicating the links between technology and organisational or professional structure (Barley 1990). Agency theory (Berle and Means 1932; Jensen and Meckling 1976) has been employed in the accounting literature to explain the information asymmetry between principal and agent in large companies that can be bridged by the appointment of an external auditor. Adams (1994) suggests that it provides a useful theoretical framework for the study of the IAF, but Eisenhardt (1989) points out that it neglects potential exploitation of workers. This may include internal auditors.

Most of the theories used to study corporate governance have either an economic approach based on shareholder or stakeholder theory (Letza et al. 2008). Unfortunately, these approaches fail to encompass the complexity of corporate governance as a social dynamic phenomenon that varies according to the institutional environment (Letza et al. 2008). Learmount (2002) suggests that alternative arguments on corporate governance are not given due consideration. Consequently, the criticisms of the economic approach have paved the way for institutional theories of corporate governance.

Therefore, a comprehensive theory of the relation between technology and organisational functions would help in addressing the micro-social and macro-social forces simultaneously. Institutional theory (Meyer and Rowan 1977; Zucker 1987; DiMaggio and Powell 1991; Tolbert and Zucker 1996) suggests several routes by which institutional change, linked with technological change or changes in laws and

regulations, might lead to shifts in both organisational structure and technical design, as in the case of the IAF.

Although institutional theory offers various mechanisms to interpret the forces behind the change in AIS, it is seldom applied to changes in the internal audit in developing countries. Moreover, it is seldom applied to changes which are a response to the ERP system implementation. This book seeks to illuminate how the internal audit practice and structural change as a response to ERP system implementation (within the organisation) embody broader cultural assumptions and constructions linked to the (outside the organisation) corporate governance environment. In other words, how the "outside" forces of the corporate governance environment affect the internal audit change as a response to the ERP system implementation "inside".

3.4.1 New Institutional Theory

According to Scott (2005), there are two generations of institutional theory: old and new institutionalism. The old theory had been descriptive regarding the examined phenomenon and did not offer such rich theoretical insights as the new version, which focuses on the relationship between organisations and their environment (Sandhu 2009).

The new institutional theory emerged in the 1970s. From a macro-perspective, Meyer and Rowan (1977), building on the work of Berger and Luckmann (1966), developed a theory that organisations are subject to rules and regulations to which they conform in order to gain legitimacy for their activities and to ensure their long-term survival. Legitimacy is "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman 1995, p. 574).

From a micro-perspective, Zucker (1977) emphasised the taken-for-granted nature of institutions and the role of cultural persistence. Drawing upon the work of Meyer and Rowan (1977), DiMaggio and Powell (1991) theorise the way that organisations show many similarities in modern societies when organisations are faced with similar conditions of uncertainty. They suggest that these similar characteristics are a result of organisational responses to institutional pressures from the environment.

DiMaggio and Powell (1991) describe the imperatives for homogenisation as "isomorphism". Institutional isomorphism is elaborated as social forces that impose pressures to develop certain practice. This is based on a rejection of rationality as a justification for organisational structure change, while emphasising legitimacy rather than efficiency as an explanation for the survival of organisations (Tolbert and Zucker 1983). The processes of isomorphism and legitimacy represent the fundamental forces explaining why and how several practices have changed (Meyer and Rowan 1977; DiMaggio and Powell 1991; Scott 1995).

According to the institutional perspective (DiMaggio and Powell 1991; Meyer 1994), individuals and organisations understand their purpose in terms of their own social environment. Thus, environments may constitute organisational structures and activities (Meyer 1994). This environment is explained by Barley and Tolbert (1997, p.93) who state that "organizations are suspended in a web of values, norms, beliefs, and taken-for-granted assumptions". These values, norms, beliefs and assumptions, which guide and constrain their actions over time, arise from the existence of institutions (Mignerat and Rivard 2005).

Institutions are patterns of social activity that shape collective and individual experience and influence the way individuals behave and relate to each other (Bellah et al. 1991). An institution is taken to be a body of knowledge and practice which is used by individuals, who are engaged in a particular body of professional activities. Thus, individuals draw upon institutions to guide their practice. An institution gives organisations or individuals lines of action, while controlling and constraining them (Scott 2001). Institutions "represent constraints on the options that individuals and collectives are likely to exercise, albeit constraints are open to modification over time" (Barley and Tolbert 1997, p. 94). Institutional theorists (Meyer and Rowan 1977; DiMaggio and Powell 1991) have suggested that institutions exert pressures and expectations. They provide outlines for organising by stating the procedures an organisation should adopt, if it is to be seen as legitimate (Meyer and Rowan 1977). According to institutional theory, organisations tend to focus on the pressures and constraints of their environment (Oliver 1991). These constraints are also called institutional pressures (DiMaggio and Powell 1991) or institution logics (Friedland and Alford 1991).

Institutional analysis applies to various levels as social actors may be individuals, groups, organisations or even larger collectives (Barley and Tolbert 1997). Generally, institutional theory offers theoretical perspectives to analyse goals, values and prescriptions that legitimate behaviours of groups (DiMaggio and Powell 1991). Professional groups, as internal auditors, within organisations draw upon a variety of institutions to guide their actions, with each of these institutions having its own institutional logic (Yoo et al. 2007).

3.4.2 Institutional Isomorphism Pressures

DiMaggio and Powell (1991) analysed three mechanisms by which institutional isomorphism may take place:

- Coercive isomorphism is illustrated by the influence of state agencies on other organisations through the enactment of legislation in the legal environment. It stems from the problem of legitimacy. It may be a consequence of formal and informal pressure exerted on organisations, including government mandate.
- Mimetic isomorphism is a process of change begun internally by the organisation as a result of adopting standard responses to uncertainty. In situations where there are uncertainties about the proper approach to follow, it is recommended to seek a successful reference group and mimetic their actions. It reflects the desire to mirror others' practice that is recognised as legitimate.
- Normative isomorphism is associated with the professionalisation of organisational fields. Training programs and professional educational reinforced by professional associations' rules and university education exert institutional pressure to normalise social practice among organisations operating in the same field. In other words, formal education and the growth of professional networks legitimise.

3.4.2.1 Governance Pressures Related to the IAF

Institutional theory has attracted a great deal of attention in auditing and accounting research and has shown its validity for interpreting the process of change and techniques of adaptation and for understanding the general tension between the external and internal environment (e.g. Lapsley and Pallot 2000; Power 2003; Modell 2003). Other studies have demonstrated how institutional theory gives deeper insights concerning the institutional context of accounting systems (Carpenter and Feroz 2001; Carpenter and Dirsmith 1993; Scapens 1994; Covaleski et al. 1996). Some of these studies have focused on managerial accounting generally (Scapens 1994), while others have focused on financial accounting (Carpenter and Feroz 2001; Carpenter and Dirsmith 1993). Sarens and Christopher (2010) confirm that institutional theory is a relevant framework to study corporate governance practice in a "comply or explain" context and within unlisted companies.

Few previous studies have used the specific features of the theory concerned with isomorphic behaviour for exploring the corporate governance pressures on internal auditing (Arena et al. 2006; Al-Twaijry et al. 2003). In the context of internal audit change within organisations, according to Al-Twaijry et al. (2003), coercive pressures consist of pressures exerted to change the IAF. Coercion occurs through mechanisms of corporate governance guidelines, rules, laws that legitimatise the change in the IAF not only to assure the internal control system's adequacy, but also to engage in a wider review of the efficiency of the organisation's activities and risk management. Mimetic pressures occur when organisations recognise that the IAF change will contribute to an improvement in control and operational performance. Normative pressures arise from an increase in internal audit professionalisation within organisations. This may take place by qualifying internal auditors as a CIA or through the IIA in the locality.

In a study conducted in Italy, Arena et al. (2006) draw mainly on coercive isomorphism to investigate the development of internal audit departments. Internal auditors are supposed to devote attention to laws and regulations that shape their activities. Institutional theory provides

Arena et al. (2006) with a means of understanding the legitimating processes which affect the internal audit development.

In the context of internal audit change within organisations, institutional theory can be used to build an argument that organisations tend to focus on their respective corporate governance guidelines as they exert pressure and expectations on their operational environment (Sarens and Christopher 2010). Institutional theory can be used in interpreting the pressures that lead to the internal audit change (Arena et al. 2006).

3.4.3 Institutional Logics

An approach to institutional analysis (Friedland and Alford 1991) posits institutional logics as defining the content and meaning of institutions. The institutional logics approach does not focus on isomorphism, but on the effects of institutional logics on individuals and organisations. By providing a link between institutions and actions, the institutional logics approach provides a bridge between the macro-structural perspectives of DiMaggio and Powell (1991) and Zucker's micro-process approaches. Friedland and Alford (1991) have developed the concept of institutional logics to explore the relationships between individuals, organisations and society. They view institutions as patterns of activity founded in material practice by which individuals produce and reproduce their material lives and render their experiences meaningful.

In order to operationalise the concept, the following dimensions of institutional logics that have been recognised in the literature are applied. First, institutional logics act as organising principles that guide activities and thus embody goals and values of the institution (Friedland and Alford 1991). Second, institutional logics are rooted in assumptions associated with specific causal means–end relationships (Bacharach et al. 1996). Third, institutional logics form local identities (Friedland and Alford 1991; Jepperson 1991; Dimaggio 1997; Thornton 2002).

3.4.3.1 ERP as Carriers of Institutional Logic

Many studies have adopted institutional theory to examine IT-related phenomena such as IT innovation, development, implementation, adoption and use (King et al. 1994; Ang and Cummings 1997; Orlikowski and Barley 2001; Haggerty and Golden 2002; Yoo et al. 2007; Mignerat and Rivard 2009). IT has been characterised as a response to institutional pressures (Orlikowski and Barley 2001; Haggerty and Golden 2002), as a trigger for organisational structuring (Barley 1986), as a carrier of institutional logics (Scott 1995; Yoo et al. 2007) and as a form of institution in itself (Orlikowski 1992; Gosain 2004).

The implementation of new IT disturbs the established stability between institutional arrangements and the requirements of daily work and introduces a dynamic of restructuring, by which tasks, responsibilities, competencies, social relationships and professional boundaries are restructured (Barley 1986). New technologies first alter tasks and skills; these changes generate opportunities and pressures for changing organisational structure (Barley 1990). The constraints of the technology, as ERP systems, force users, as internal auditors, to engage in patterns of activity that reinforce existing systems (Barley and Tolbert 1997). ERP systems implementation may show that new skills come to the surface. Therefore, professional groups will compete for the right to define their roles to their own advantage. Focusing merely on skills and tasks is insufficient for investigating the linkage between IT and social organisation. If ERP systems are to influence some forms of social order, they must do more than change internal auditors' abilities. They also affect the relationships on which social orders are grounded (Barley 1990). ERP systems shape social action through conferring identities on actors and determining what is to be remembered and what to be forgotten (Douglas 1986). In addition to these cognitive elements, ERP systems also embody normative rules which are prescriptions of behaviour for positions or actors (Gosain 2004).

Institutional logics are "sets of material practice and symbolic constructions which constitute a field's organizing principles and which are available to organizations and individuals to elaborate" (Friedland and Alford 1991, p. 248). DiMaggio (1997) points out that the idea

of institutional logic is consistent with themicro-level concept of "logics of action". Logic of action is an implicit relationship between means and ends underlying the specific actions, policies and activities of organisational members. ERP systems have been characterised as carriers of institutional logics. For example, Gosain (2004) proposes that ERP systems embody institutional logic as he states that these systems are "an important embodiment of institutional commitments and serve to preserve these rules by constraining the actions of human agents" (Gosain 2004, p. 151). Gosain (2004) suggests that ERP systems have a particular logic of the organisation's activities that enable certain actions while denying legitimacy to others. Institutional logics define the norms, values and beliefs that structure the cognition of actors in organisations (DiMaggio 1997). In the same vein using institutional theory, Yoo et al. (2007) show how the local responses to an ERP implementation are affected by the congruence with the associated institutional logics. The institutional logic associated with an ERP is often accompanied by institutional pressures whereby actors can respond with different strategies.

Studies have documented the potential misalignment between the incumbent institutional logics and those embedded in ERP systems. For example, Sia et al. (2002) provide evidence that when the organisational structures have been imposed by external institutions, organisation may not be able to adopt the ERP system's embedded processes. Instead, it will comply with the requirements of external authority. Furthermore, Markus and Tanis (2000) suggest that misalignments between an ERP system's functionality and the current work patterns in an organisation often lead to workarounds. ERP systems embody a template for the performance of the organisation's activities. ERP systems imply several assumptions about how organisational processes should work, but the fit to organisational needs is often lacking. Soh et al. (2000) explore the misalignments between the structures embedded in the ERP system and the existing organisational structures.

An ERP system can be seen to represent particular logics or a procedural focus (Soh et al. 2000; Sia et al. 2002; Gosain 2004; Kallinikos 2004). One of the principles associated with the ERP system's logic is control (Ciborra 2000; Sia et al. 2002). The objectives of this principle

are achieved through some assumptions which include, for example, standardisation (Soh et al. 2000; Kallinikos 2004) and integration (Davenport 1998; Markus and Tanis 2000; Soh et al. 2000). ERP systems are provided with assumptions inherited from reference industries, countries and managerial interests (Gosain 2004; Soh and Sia 2004), which reflect specific practice.

Previous studies mainly investigate whether organisations acquiesce with institutionalpressures. However, Oliver (1991) proposes a whole set of legitimating strategies and tactics associated with them, but the only tactic studied was compliance. Mignerat and Rivard (2009) suggest that researchers have a whole range of legitimating strategies at hand that have not yet been taken into account. ERP introduction and its impact on internal auditors as a professional group within the organisation are research areas where such strategies as compromise, manipulation and avoidance are very likely to exist (see Sect. 2.8.4).

Institutional theory has been believed to be a meaningful approach for IS research (Orlikowski and Barley 2001). It has been promoted to be mainly well suited to the study of ERP systems (Gosain 2004). Although there are a lot of studies which have used institutional theory in the IT context, few ERP-related studies use institutional theory (e.g. Gosain 2004; Soh and Sia 2004). In both studies, REP systems are considered to embody an institutional logic. Organisations that respond to the ERP system implementation are conceived as singular actors, where the institutional forces embodied by the system are not in alignment with all the functions within the organisation (Gosain 2004; Soh and Sia 2004). Organisations encompass multiple and nested institutional logics, so there is a need to probe beneath the adaptation of the entire organisation and focus on specific responses associated with particular routines (Yoo et al. 2007) such as the IAF.

3.4.4 Strategic Responses

Institutional theory has been criticised for placing too much emphasis on organisations and actors as passive recipients of institutional forces, focusing on how organisations are influenced by external pressures to adopt similar institutional structures (Perrow 1985; Oliver 1991; Scott

1995). The problem is that institutional theory depicts an institution as somehow distinct from those who comply with it and from the act of compliance itself (Tolbert and Zucker 1996).

Barley and Tolbert (1997) have argued that the model of organisation and environment drawn by the concept of institutional isomorphism precludes the power of organisational actors in interacting with the environment to construct and reconstruct their environment. Robson et al. (2007) argue that a problematical aspect of institutional theory has been seeing changes internal to organisations simply as responses to external "isomorphic pressures". Scott (1995) suggests that organisations be regarded not as passive pawns controlled by their environments' demands, but as active players, capable of responding strategically to environmental pressures. Oliver (1991) and Greenwood and Hinings (1996) have indicated that though institutions are constraining by nature, organisations can respond differently to institutional pressures and logics.

Institutional theory has been extended to encompass a variety of strategic responses to the institutional pressures. In particular, Oliver (1991) notes that institutional pressures towards conformity can vary. This extension of traditional institutional theory helps to explain how different organisations which operate in the same institutional environment can have different structures. With institutional pressures, organisations apply strategies to gain or maintain their legitimacy (Suchman 1995). Acquiescence is the strategy among many strategies for managing legitimacy. It has been suggested that organisations can adopt other strategies as a response to institutional pressures (Oliver 1991; Suchman 1995). Oliver (1991) suggests that organisations do not always comply but may engage in defensive actions. She suggests some strategic responses that organisations may enact as a response to institutional pressures.

Oliver (1991) proposes five strategies, which help explain how legitimacy is managed under institutional pressures:

- Acquiescence strategy is conscious intent to conform. It is expressed through the tactics of habit, imitation and compliance.
- Compromise strategy is used when organisations promote their own interests through tactics such as balancing, pacifying and bargaining.

- Avoidance strategy is an attempt to prevent the need to conform to an external pressure using avoidance tactics such as concealing, buffering and escaping.
- Defiance strategy is the rejection of institutional norms using defiance tactics which included missing, challenging and attacking.
- Manipulation strategy is the purposeful and opportunistic application of the tactics of co-opting, influencing or controlling an institutional pressure.

3.4.5 Maintaining the Legitimacy of the IAF

Institutional theory offers acoherent account of how complying with institutional demands is an attempt to maintain legitimacy (DiMaggio and Powell 1991). Addressing multiple demands could cause a dilemma that satisfying one demand may violate others, thus potentially jeopardising legitimacy. Understanding how to respond to institutional demands requires knowledge of when such demands are likely to arise and how they may be imposed. The nature of demands is an important factor when studying responses as it allows predicting the degree to which these demands are negotiable. Institutional demands may influence at the ideological level, prescribing which goals are legitimate to pursue, or they might exert pressures at the functional level, requiring the adoption of appropriate means or legitimate courses of action (DiMaggio and Powell 1991; Oliver 1991).

Scott (2008) gives another definition of legitimacy, other than the general entities' legitimacy definition by Suchman (1995), which is considered more appropriate for the legitimacy of professions such as the IAF. Legitimacy is "a condition reflecting perceived consonance with relevant rules and laws, normative support, or alignment with cultural-cognitive frameworks" (Scott 2008, pp. 59–60). Greenwood et al. (2002) investigate how the profession legitimates the change to itself. They claim that diffusion of new practice occurs only if new ideas are compellingly presented as more appropriate than existing practice. Legitimatisation in professional settings is a function of professional

appropriateness. What matters is the demonstrated conformity of adaptation with the values embedded in professional beliefs. It is only when ideas are perceived to be consistent with prevailing values that their adoption appears legitimate. The transition is achieved either by aligning new ideas within prevailing normative prescriptions, thus giving them moral legitimacy (Suchman 1995) or by asserting their functional superiority, thus giving them pragmatic legitimacy (Suchman 1995). Suchman (1995) presents pragmatic legitimacy as involving self-interested calculations such as whether the benefits of adopting a practice outweigh the costs. Moral legitimacy is based on whether a given practice is "the right thing to do" based on the consequences of carrying out the practice and the techniques and procedures involved.

The IAF's practice and structure would be expected to be legitimated by illustrating how the internal auditors' expertise can be applied to benefit organisations after ERP introduction. By doing so, the position of the IAF in organisations would be secured. Although it is clear that internal auditors are aware of governance institutional pressures and new ERP logics, it is not clear how they interpret and act on them, perhaps by innovations such as new structural forms or adapting technologies. Both are themselves a medium through which to reconstruct their social reality in accordance with their professional identity (Robson et al. 2007).

When ERP systems impose a new logic, internal auditors may find themselves in disagreement with IT personnel which makes communication between the different groups difficult. Internal auditors can be expected to adhere to the old institutional logics that have guided their actions in the past, and they will not simply move to new institutional logics before they are convinced (Thornton 2002).

Given the organisational force behind ERP systems implementation, internal auditors may engage in a variety of types of response. These range from acquiesce to manipulation, in accordance with the extent of the similarity between the existing institutional logic that guides their routine and those of ERP systems. For the IAF within an organisation, the new institutional logic of the ERP system may conflict with their existing legitimate procedures (Meyer and Rowan 1977), resulting in different configurations in internal audit and new relationships with

other practice. This suggests that an internal auditors' response to an ERP implementation within the governance environment will be more pluralistic and complex than singular and homogeneous responses that are suggested in the literature.

In the next chapter, a framework is presented that does not simply observe and recite the different pressures, internal technologies and external environments, which act upon internal auditors, but one that delineates the phenomenon of ERP usage and its impact on the internal auditors' change from an institutional perspective. The target framework has something to say about how these pressures are constructed, perceived and drawn upon in action by internal auditors within their organisations in a way that changes the IAF. The emphasis here is on contributing to an understanding of internal audit change by highlighting the processes through which adaptation within the internal audit field maintains its legitimacy as an effective governance mechanism.

3.5 Conclusion

This book draws on institutional theory to interpret IAF changes. It is used to interpret results as it examines how institutions influence organisational actors and provides a mean of analysis. The internal audit change process is viewed as a response to the new ERP system which constrains activities and shapes the cognitive processes of internal auditors, and corporate governance's forces that influence specific configuration of the IAF. Between these two main aspects is the process of resolution of institutional misalignments through the strategic response to institutional pressures. While the majority of researchers work from a macro- or a micro-social perspective, the two may be best understood as complementary processes. ERP technologies exert pressures on the social organisation of work. Moreover, human actions are constrained by forces beyond the control of actors and often outside their awareness. Therefore, a comprehensive model of the relation between IT and organisations would address micro- and macro-forces at the same time.

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4

An Institutional Framework for IAF Adaptation

4.1 Introduction

A theoretical framework is developed and presented in this chapter. According to Walsham (1995, p. 76), it is recommended that a researcher embarking on interpretive case studies "creates an initial theoretical framework which takes account of previous knowledge". A conceptual framework lays out the key constructs related to the phenomenon being studied and the presumed relationships among them (Miles and Huberman 1994).

The IAF and its activities have significantly changed to cope with the evolutions of corporate governance (Bailey et al. 2003) as well as IT evolution (Allegrini et al. 2006). Because of ERP system's sophistication and highly integrated nature, it has great potential to shape the internal audit's structure and practice (Avgerou 2001; Barrett et al. 2001). The pressures on the internal audit reveal the struggle to demonstrate that the function can add value (Spira and Page 2003). As the reach of ERP systems continues to stretch across diverse practice, it is imperative that researchers and practitioners understand more about the interaction of ERP systems with the contexts in which they are implemented.

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The aim of this chapter is to develop a conceptual framework for analysing IAF adaptation after the introduction of ERP systems in the corporate governance context. The proposed framework is intended to guide study to explore the changes in the IAF associated with ERP systems implementation and to arrive at conclusion that supports policy makers, auditors, managers and organisations. To devise a rigorous formulation for the framework, it is based on institutional theory and the review of the relevant literature of using the theory in the IS and accounting fields discussed in the previous chapter. The chapter begins with the evolution of the framework and its main components to help clarify the sources of the theoretical perspectives that inspire the development of the proposed framework.

The particular institutional perspectives adopted in the research are discussed in Chap. 2 and operationalised in the following sections. In the sequence sections, each construct of the conceptual framework is discussed: corporate governance pressures, ERP systems institutional logic and possible responses of the internal audit. The researcher offers a comparison between this research and previous studies that applied institutional theory to locate the stance of this research. Finally, a summary of the main aspects discussed is presented in the end of this chapter.

4.2 Institutional Perspective

Institutional theory offers a potentially fruitful lens for studying the new IT. The institutional perspectives can inform systemic and structural understanding that takes into account not only technorational explanations, but also social and normative considerations beyond the immediate context of the system and its use (Orlikowski and Barley 2001).

Institutions are conceived to be relative to particular contexts and levels of analysis (Jepperson 1991). Institutional analyses typically view institutions as exogenous forces acting upon individual organisations or organisational fields (Scott 2008). DiMaggio and Powell (1991) explain

that organisations faced with similar pressures resemble each other. They assert that isomorphic organisational changes are responses to coercive and normative pressures of external institutions or through mimetic processes. Institutional isomorphism is a prevailing theme throughout institutional research, thus often giving the impression that institutional theory is concerned solely with isomorphism (Lounsbury 2007). Institutional theory is by no means a singular and consistent theory; however, it consists of a variety of perspectives.

The adopted collective perspectives try to avoid the criticism that each sole perspective faces, fill the gaps in the institutional literature and use the institutional analysis in new areas and levels of analysis. Institutional research has been criticised because of its neglect of institutional change (Scott 2008). One noteworthy exception that addresses changes is Barley (1986), who describes new IT as a trigger for changes. One more common criticism is the tendency to view organisations as passive actors in their response to institutional pressures (Oliver 1991; Scott 2008). Oliver (1991) proposes a framework of possible responses to institutional forces. The final criticism that will be addressed in this study is the general treatment of organisations as singular and homogenous actors. While most of institutional literature focuses on macro-level phenomena concerning organisational fields, with organisations at the lowest level of institutional actor, DiMaggio and Powell (1991) suggest that any macro-level phenomena can find their roots in micro-level actions. Indubitably, when addressing certain organisational field-level issues, it is acceptable to address organisations as "homogenous, internally isomorphic" actors (Crouch and Farrell 2004, p. 32). However, when addressing issues within individual organisations, a richer institutional view is typically in order (Friedland and Alford 1991).

The view adopted in this research attempts to take each of these criticisms seriously. Governance applies pressures upon practice on the macro-level and ERP systems impose new logic in the micro-level. However, there are a number of strategies available to the IAF in response. Also, an organisation can typically be thought of as a nexus of multiple institutional practices. This set of assertions forms the foundation for this model of institutional pressures and logics within organisations.

4.3 External Pressures of Corporate Governance

According to an institutional perspective, corporate governance is considered as a social process affected by non-economic factors such as culture, legal frameworks and human factors. The three mechanisms identified by DiMaggio and Powell (1991) that bring about institutional change can also be applied to governance where they act as control mechanisms that constrain behaviour (Haggerty and Golden 2002).

- Coercive pressures: governments implement regulations to direct, constrain and regulate the behaviour of those under their influence. Coercive pressures are exerted through activities of knowledge deployment, such as requiring education and training and institution of standards and directives (King et al. 1994). The most important mechanism of corporate governance is the system of laws, regulations, institutions, regulatory agencies and the accounting and auditing systems that provide the framework within which organisations operate (Denis and McConnell 2003). This mechanism relates not only to the existence of laws and institutions, but also to their level of enforcement (Berglof and Claessens 2006). Banks (2004, p. 56) states that "micro-corporate governance can only function properly when the law is effective at the macro-level". Organisational actions are enmeshed within a broader context of persistent institutions that guide actions.
- Normative pressures can bring institutional change to organisations through professionalisation, which is "the collective struggle of members of an occupation to define the conditions and methods of their work, to control the production process, set-up a cognitive basis and seek legitimacy" (DiMaggio and Powell 1991, p. 152). Professionalisation includes formal education or professional networks through which new models can emerge. The normative pressures are based on internal auditors' social obligations, which are observable through values and norms.

- Mimetic pressures: organisations and groups as internal auditors will tend to copy others they consider to be leaders in other organisations. According to DiMaggio and Powell (1991) and Scott (2001), mimetic pressure changes organisations over time to be more like others through imitation. Here the wider belief systems and cultural rules are adopted to deal with uncertainty or ambiguity. Organisations tend to imitate other successful organisations "to avoid being noticed as different" (Scott 1995, p. 45).

Internal auditors, as organisational actors, aim at maintaining legitimacy in their organisation, in order to be accepted and ensure their long-term survival (Meyer and Rowan 1977). Internal auditors' discretion in response to ERP systems implementation is constrained by the institutions that guide their practice, and therefore, any response to new institutional logics must be consistent with existing governance institutional pressures. Applying this conceptual framework can clarify the interaction among pressures and identify which play more crucial roles in a particular context, therefore guiding IAF adaptation in a more effective way. It is argued that these pressures govern the structure and practice of the IAF within organisations; consequently, the discretion of the organisations and IAF's response to ERP systems implementation should be within the institutionalised internal audit framework. This view is depicted in Fig. 4.1.

Examples of research applying the same theoretical perspective in the internal auditing field are Arena et al.(2006) and Al-Twaijry et al.

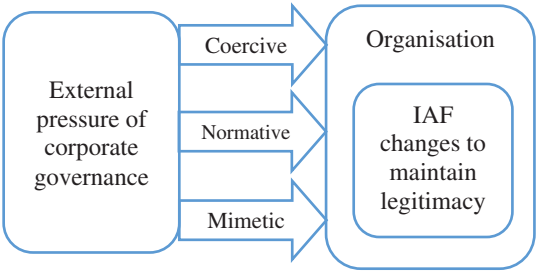

Fig. 4.1 Governance pressures on organisations and IAF

(2003). While Arena et al. (2006) focus on the coercive pressure at the organisation level, the study takes into consideration all types of pressures. Moreover, while Al-Twaijry et al. (2003) focus on the organisational field, the study focuses on the governance pressures related to the IAF and internal control in general on organisation and sub-organisation levels.

It is suggested that defining the governance impacts from different levels advances the knowledge regarding the multi-level constraints of the IAF change. This leads to the first research question:

> RQ1. What is the macro-governance pressure associated with the IAF and how do these pressures direct the IAF practice and structure in the sub-organisational level?

4.4 ERP Systems' Logic

Institutional analysis is particularly well suited to ERP systems (Gosain 2004; Soh and Sia 2004; Sia and Soh 2007). Institutional analyses of ERP systems introduction can prove particularly fertile for assessing a variety of outcomes within a given organisation. While some researchers make a case that ERP systems represent deterministic pressures on organisations (Kallinikos 2004; Gosain 2004), others deal with the limitations of this determinism and focus on situated reactions (Ciborra 2000; Boudreau and Robey 2005; Elmes et al. 2005). In such cases, the material nature of ERP cannot be ignored (Volkoff et al. 2007) and can be perceived distinctively.

Avgerou (2000) considers ERP as an institution and confirms that "IT became one of the most significant factors justifying and enacting organizational change" (p. 240). ERP systems have a directive power which comes from cognitive and normative elements embedded in them (Gosain 2004). In addition to these cognitive elements, ERP also embodies normative rules which are prescriptions of behaviour for actors. These rules constrain internal auditors into sets of routines that are legitimate and derived from the system designers' choices.

Friedland and Alford (1991) suggest that institutions can be studied on three levels: individuals, organisations and society. They introduce the term "institutional logic" as a mediating concept to explore the interrelationships between these levels of analysis (Friedland and Alford 1991, p. 242). Thornton and Ocasio (1999, p. 804) define institutional logics as "the socially constructed, historical patterns of material practice, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality". An institutional logic is the way a particular social world works (Thornton and Ocasio 2008). An ERP system embodies a specific institutional logic that may be congruent or incongruent with internal audit's incumbent institutional logics. ERP systems grew out of the accounting functions and have been said to embody institutional logic that can be identified as managerial rationalism (Gosain 2004).

Gosain (2004) suggests that ERP systems embody institutional logic and states that these systems are "an important embodiment of institutional commitments and serve to preserve these rules by constraining the actions of human agents" (p. 151). ERP systems embody logic of the organisation's activities enabling some activities while denying legitimacy to others (Gosain 2004). The institutional logic associated with ERP systems is often accompanied by institutional pressures whereby different strategies can be adopted as a response (Yoo et al. 2007). In order to operationalise the concept, four dimensions of an institutional logic will be applied, i.e. principles, assumptions, identity and domain (Yoo et al. 2007, p. 6).

Institutional logics act as organising principles that guide activities, thus embodying the goals and values of the institution. They are founded on assumptions associated with specific causal means–end relationships, and they form local identities. Institutions are more or less significant in specific domains and their practice.

ERP systems can be seen to represent a particular rationalised logic or procedural focus (Sia et al. 2002; Gosain 2004; Kallinikos 2004). The main principle associated with ERP systems is control (Ciborra 2000; Sia et al. 2002). This principle is achieved through assumptions such as

standardisation (Scapens and Jazayeri 2003; Kallinikos 2004; Shehab et al. 2004; Blackstone and Cox 2005); *visibility* (Sia et al. 2002); and *integration* (Scapens and Jazayeri 2003; Davenport et al. 2004; Shehab et al. 2004; Dillard et al. 2005; Trimi et al. 2005). ERP systems are provided with assumptions inherited from reference industries, countries and managerial interests (Gosain 2004; Soh and Sia 2004), which reflect the identity of administrative practice. Such practice is particularly compatible with the domain of very explicit procedures (Davenport 1998; Scapens and Jazayeri 2003; Kallinikos 2004).

Thus, ERP systems embody specific logics for controlling business processes; however, it is argued that the control principle of ERP systems is based on more unexplored assumptions than are mentioned in the literature. As the assumptions implicit in an ERP system's control logic vary according to context, "it is important to examine the content of institutional logics by investigating the specific beliefs as they are understood and interpreted by field members" (Scott 2001, p. 139). Therefore, by focusing on the IAF, the study explores the assumptions related to the control principle of the ERP systems in order to investigate how ERP systems implementation affects auditing practice and consequently internal auditors' identity within organisations in the domain of corporate governance practice.

It is suggested that investigating the assumptions underpinning the control logic of ERP systems advances knowledge of the internal auditors' perception of these assumptions and consequentially advances understanding of the needed change. This leads to the second research questions:

> RQ2. What are the control assumptions of ERP systems that have impact on the IAF and how do the participants perceive these assumptions?

4.5 IAF Response and Adaptation

Internal audit change is actively implicated in interventions. This calls for recognition to be given to internal auditors' capabilities to facilitate the change of professional practice by legitimising the new internal audit structure and practice in the new technological environment.

Gosain (2004) asserts that it is important for organisations to deal with the potential conflict between the incumbent institutional regime, corporate governance institutional pressures and institutional logics embedded in ERP systems. The internal audit adaptation can be viewed as a response to the new ERP systems which constrains the activities of organisations and shapes the cognitive processes of internal auditors and corporate governance's institutional forces. It can be proposed that with the introduction of ERP systems, internal auditors respond in a variety of ways in accordance with the extent of congruence between the institutional logic that guides their everyday routine and those of the ERP systems and of the corporate governance.

This study draws on the view which holds that organisations are at the intersection of multiple institutional logics (Meyer and Rowan 1977). Therefore, a new institutional logic may bring misalignment with the existing one in the IAF. It may result in loose coupling between the existing practice and the new institutional requirements (Meyer and Rowan 1977), resulting in different changes in internal audit practice and new relationships with other practice. This suggests that an internal auditors' response to the implementation of the ERP systems within the governance environment can have much more complex consequences than a single response.

Within an organisation, it is anticipated that the presence of incumbent institutional logics in internal audit practice may conflict with that of the ERP system or the corporate governance. DiMaggio (1997) describes conflicting logics as inconsistent cognitive schemes that are simultaneously applied to the same situation. There are two anticipated scenarios of the interaction among institutional logics:

- Two potentially inconsistent institutional logics are applied to the same domain and cannot simultaneously guide the practice without fundamentally changing this practice.
- Two institutional logics are applied to the same practice, and this practice can be guided by these logics without the dissonance.

Internal auditors can be expected to adhere to the old institutional logics that have guided their actions in the past, and they will not easily

move to new institutional logics (Thornton 2002). When the new institutional logics are presented forcefully, internal auditors have a number of potential strategies to respond. Understanding of conflicts, which may occur, is essential to analyse a range of internal auditors' responses to a new ERP system. The five strategies proposed by Oliver (1991) (see Sect. 2.8.4) help to understand how legitimacy is managed under institutional pressures. Previous studies mainly investigate whether organisations acquiesce with institutional pressures, but Oliver (1991) proposes a set of legitimating strategies and tactics associated with them. Mignerat and Rivard (2009) suggest that there is a range of legitimating strategies which have not yet been taken into account. ERP implementation and its impact on internal auditors as a professional group within the organisation are research areas where such strategies as are very likely to exist.

Internal auditors' discretion in the form of strategic response is bounded by the institutions that gave rise to it. Therefore, responses to institutional pressure should be consistent with the existing institutions (Goodrick and Salancik 1996). Orlikowski and Barley (2001, p. 145) suggest that *"the transformations currently occurring in the nature of work and organizing cannot be understood without considering both the technological changes and the institutional contexts that are reshaping economic and organizational activity"*. Therefore, in order to investigate the transformation currently occurring in the internal audit, this study considers both the ERP system introduction as the technological changes, while the corporate governance as the institutional contexts that are reshaping organisational activity. Figure 4.2 shows the conceptual framework that underpins the research.

In order to determine the nature of the strategic response of the IAF, the study will look at the changes in the characteristics of the IAF structure and practice by investigating the variables identified through the literature review such as: scope of services, role played in internal control and risk management, skills, budget, tools, relations with IT departments and the external auditor.

Internal auditors have had extreme aspirations and efforts aimed at maintaining their legitimacy consistent with corporate governance initiatives (Power 2003), as well as with the new IT-induced usage. Internal

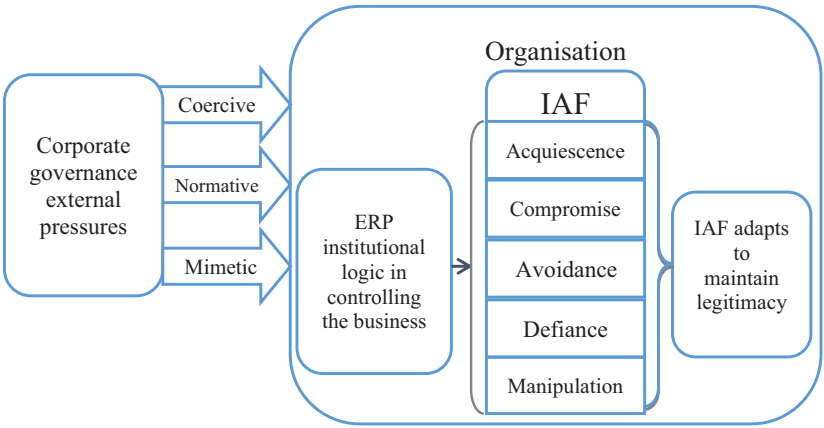

Fig. 4.2 Conceptual framework for IAF adaptation

auditing has its legitimacy, and at the same time, it produces legitimacy. However, change must be legitimated itself on a constant basis. The legitimacy of the IAF is always endangered by the misalignment of expectations about and within it. These threats put pressures on organisations for the rationalisation and formalisation of the IAF.

The pervasive use of ERP systems provides the infrastructure necessary for the effective evolution of the IAF (Kuhn and Sutton 2010). The aim of this study is to understand and interpret the IAF adaptation as a response to the ERP system's introduction in order to improve its effectiveness as a corporate governance activity using institutional theory. The study seeks to illuminate how the internal audit change in terms of practice and structure (inside the organisation) as a response to ERP system implementation embodies broader cultural assumptions and constructions linked to the (outside the organisation) corporate governance environment. The focus of the study is therefore on explaining and understanding how the change in the IAF is shaped by both exogenous and endogenous forces. Institutional theory is particularly relevant for analysing professional groups that are confronted with uncertainties and, as a result, compete for institutional legitimacy. This leads to the last three research questions:

RQ3. How has the alignment between ERP systems logic and governance been made?

RQ4. How does the IAF adapt after ERP system introduction and how does this relate to the governance pressures?

RQ5. How do these adaptations affect the legitimacy of the IAF?

4.6 Conclusion

The conceptual framework based on institutional theory that has been described in this chapter will be used to investigate how the institutional logic associated with ERP systems and the institutional pressures of corporate governance regulations affect the IAF. These institutional logics often come with strong institutional pressures whereby internal auditors can respond with strategies such as acquiescence, compromise or avoidance.

The rationale of applying different institutional perspectives stems from the need for multi-level analysis of the forces, assumptions and characteristics that influence the IAF in the ERP and governance context. The multi-level approach considers the wider contextual variables and addresses the criticisms of institutional theory.

This chapter concludes the review of literature and development of the theoretical underpinnings of the study. The next chapter discusses the methodology adopted for the empirical investigation of the research questions.

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5

An Interpretive Approach for Data Collection and Analysis

5.1 Introduction

This chapter describes the research methodology employed in this book to gather and analyse the necessary data to address the research issues and to achieve the intended contribution, and it also explains the rationale for the use of this research methodology. Initially, the chapter in Sect. 5.2 discusses the epistemological stance and the suitability of the interpretive stance for the research, as justified in Sect. 5.2.1. It proceeds to explain and justify the reasons behind the selection of a qualitative methodology in Sect. 5.3. Thereafter, the adoption of the case study strategy is justified in Sect. 5.4. In Sect. 5.5, it is explained how the methodology is employed to elicit data. Then, data collection methods are discussed with a clarification of the rationale for choosing them in Sect. 5.6. The chapter moves on in Sect. 5.7 to discuss the data analysis strategy that has been adopted and how certain strategies are used to ensure the trustworthiness of the research. Finally, the ethical considerations are discussed and a summary is presented.

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5.2 Research Paradigms

In order to be able to conduct a solid piece of research that delivers what it promises, it is helpful to have knowledge of the basic philosophical concepts. The philosophical basis of any research should outline the view of the nature of knowledge from two important aspects of research (Henn et al. 2006): What can be considered as knowledge? And, how that knowledge can be acquired? This means how is reality being viewed and how valid and reliable knowledge about this reality can be gained.

The choice of a research methodology needs to be guided by a research paradigm which has a theory of the nature of reality, ontology and a theory of how knowledge about reality can be gained, epistemology (Myers 2009). The term "paradigm" has been used quite loosely in academic research; it can mean different things to different researchers. The research paradigm refers to the progress of scientific practice based on people's philosophies about the nature of reality and knowledge (Collis and Hussey 2009).

IS research is not rooted in a single theoretical perspective; therefore, there is plethora of philosophical assumptions which can be used according to the phenomenon under research (Orlikowski and Baroudi 1991). AIS is multi-disciplinary; therefore, the identification of an appropriate research approach is not a simple task. In the areas of the social sciences and IS, according to Sedmak and Longhurst (2010), it appears that a common language is absent because the possible approach areas diverse as the members of the research community itself. There is no uniform agreement about the ontological and epistemological basis of social science (Guba and Lincoln 1998) or information systems (Orlikowski and Baroudi 1991). However, a research paradigm is a world view that guides researchers in their work and each paradigm assumes an ontological, an epistemological and a methodological perspective (Guba and Lincoln 1998).

Ontology is concerned with ideas regarding the existence of and relationship between people, society and the world in general, "what is there in the world?" (Eriksson and Kovalainen 2008, p. 14). It is

concerned with the nature of reality, that is, whether reality exists independently of people's consciousness and, therefore, should be treated objectively or is the product of people's consciousness and therefore should be treated subjectively. Epistemology is concerned with "What is knowledge and what are the sources and limits of knowledge?" (Eriksson and Kovalainen 2008, p. 14). It is concerned with what counts as knowledge in a field of study. Methodology focuses on the process of research as a whole. It determines the important relationship between theory and method and reflects specific ontological and epistemological theoretical views which help researchers to choose a suitable research method (Bryman 1988).

The purpose of this section is not to provide a comprehensive account of the philosophical arguments of different research paradigms, but rather to establish the ontological and epistemological approaches followed in this study and their impact on selecting the appropriate methodology in the context of the research.

Different research approaches could be used to address the research question. These approaches can be classified according to their philosophical assumptions. The work of Burrell and Morgan (1982) has offered a classification of four social science paradigms which can be used to generate fresh insights into real-life problems. The four paradigms are: functionalist, interpretive, radical humanist and radical structuralist. These four paradigms are based upon two dimensions: the regulation–radical change dimension and the objective–subjective dimension. The regulation–radical change dimension organises theories according to the degree to which they assume that the world needs to be regulated (e.g. functionalism) or changed radically (e.g. Marxism). The objective–subjective dimension organises theories according to the degree to which they assume that social phenomena have an objective existence independent of social agents and are therefore "out there" to be discovered (e.g. positivism or empirical realism) or created by social actors and therefore can only be understood through the actors' own subjective interpretation of them (e.g. interpretivism) (Saunders et al. 2009). Each paradigm has its own ontological, epistemological and methodological positions.

Positivism has been defined as "an epistemological position that advocates the application of methods of the natural sciences to the study of social reality" (Bryman 2004, p. 11). According to Collis and Hussey (2009), positivism assumes that studies conducted in the social sciences should be conducted in the same way as studies carried out in the natural sciences. Proponents of technology as an exogenous force for organisational change have tended towards positivism. They posit IT as separate from humans and organisations and directly impacts human behaviour and organisational characteristics (Orlikowski and Baroudi 1991).

Interpretative research aims to gain deeper understanding of a phenomenon, which can then inform other situations, rather than seeking generalisations. The intention is to increase understanding of a phenomenon within particular situations, where the phenomenon is studied in its natural context from the participants' perspective and the researcher does not impose a priori understanding of the situation on it (Orlikowski and Baroudi 1991). Walsham (1993, 1995b) highlights the valuable contribution of an interpretive approach to IS theory and practice, as the focus and concerns of IS research have been shifting from technological towards social and organisational issues of IS. When understanding IT as neither fixed nor universal but as emerging from reciprocal interpretation and interaction, an ontological priority is given to the role of the human in IT use. This is a shift away from an abstract understanding of IT to a view of it being social and grounded in specific contexts. A methodological shift is also entailed in this perspective, as researchers' accounts of technological use using this view conduct detailed interpretive research (Orlikowski 2009).

5.2.1 The Choice of Interpretive Paradigm

The particular paradigm adopted for a particular research project is partly determined by the dominant paradigm in the research area and partly by the nature of the research problem (Collis and Hussey 2009). The research aims at understanding the inter-relation between IAF

adaptation and ERP systems introduction to increase understanding of this phenomenon within a particular situation, where the phenomenon is studied in its natural context from the participants' perspective. In particular, the research is interested in looking at how the IAF changes to cope with the changes in internal control and risks brought by ERP systems in order to promote corporate governance practice. This study aims to provide evidence of a non-deterministic perspective, to increase understanding of the phenomena within a particular context and to examine the phenomena from the participants' perspective. Interpretive research does not predefine dependent and independent variables, but rather addresses the complexity of the situation (Kaplan and Maxwell 1994).

Considering the scope and depth of the research, an interpretivist paradigm is adopted. The phenomenon under study will be understood in its real-world context, and lessons will be elicited drawing on the analysis. The phenomenon under study has organisational and social focuses; therefore, an interpretivist stance is appropriate. The main philosophical position of the study is the interpretivist point of view, where the main concern is about subjective and shared meaning. This philosophical position is interested in how social groups understand social events and settings. Interpretive study starts with the assumption that changing and individually constructed reality is only accessed through social constructions such as language (Eriksson and Kovalainen 2008). The research does not predefine dependent and independent variables; however, it is concerned with the full complexity of human sense making as the circumstances appear.

Interpretive research in the IS field is concerned with understanding the social context of ISs. Interpretive studies do not aim to prove a hypothesis, but explore and explain how all factors are related and interdependent in a particular social setting (Oates 2006). This research aims to understand what happens in that setting from the participants' perspectives without imposing the researchers' previous understanding or expectations.

According to the subjective epistemological view, there is no possible access to the external world beyond our own interpretation of it.

In other words, from interpretivism's epistemological view, knowledge is available only through social actors (Eriksson and Kovalainen 2008). However, the interpretive paradigm represents one strand in IS research, but there are signs that interpretivism is gaining ground (Walsham 1995b).

Using the ontological assumptions of interpretivism, the study considers that the world is socially constructed and can only be understood by examining the perceptions of the human actors. Epistemologically, the study attempts to minimise the distance between the researcher and what is being researched. The researchers will be involved in different forms of participative enquiry. Consequently, as a social researcher, it is important to understand the social meaning of phenomena with the purpose of providing reasons for the occurrence of social phenomena. Methodologically, the method is so closely intertwined with the ontological and epistemological assumptions of the paradigm that it permeates the entire research design. The study adopts an empirical approach focusing on human interpretations related to ERP systems. The method for such interpretative investigation is often an in-depth case study (Walsham 1995a).

Most of the previous studies have adopted a positivist paradigm, where the world is simplified in objective cause–effect relationships. Researchers have referred to such approaches' limitations in giving deep knowledge about a phenomenon (e.g. Walsham 1993). This study is concerned with a practical perspective on internal audit change within the ERP systems environment particularly. Analysing practice is central to this research work; therefore, the research methods are contextually dependent. The interpretive approach increases understanding of the implications of implementing IS in organisations (Orlikowski 1991). The aim of this study is to increase understanding about possible consequences of implementing ERP systems for corporate governance processes and the influence on the IAF. ERP systems are understood in this context as socially defined and thus relevant only in relation to the people engaging with them (Orlikowski 2009). Field studies drawing on interpretive approaches offer some account of what actors at various levels within organisations are doing with the technology. Orlikowski and Yates (2006) suggest that interpretive approaches

are particularly valuable as they afford the possibility of gaining a view of IT-mediated organisational change by focusing on the everyday practice of actors. A focus on auditors' practice entails a detailed examination of the micro-level interactions that are shaped by ERP and institutional conditions.

The nature of the research problem where there is a need to understand the interplay and the interaction between the context and the IAF implies selecting the interpretivist stance. The study aims to increase the understanding of the IAF adaptation rather than quantifying significance or causality. According to Pettigrew et al. (2001, p. 699), "change explanations are no longer pared down to the relationships between independent and dependent variables but instead are viewed as an interaction between context and action".

The literature review and analysis presented in the previous chapters indicate that there are many managerial and technical issues related to the introduction of ERP systems and their impact in the accounting and auditing field. These impacts appear to be multiple, complex and inter-related. Hence, how ERP systems affect the IAF cannot be separated from their organisational, technical and cultural context. Therefore, there is a need for a research approach that allows understanding ERP systems' impact on the internal control system and the adaptation of the IAF to cope with the new working environment. For these reasons, an interpretive methodology is considered to be the most appropriate for this study. Moreover, prior IS studies find that the interpretive paradigm is better equipped to appreciate the richness of a social context in comparison with the positivist paradigm (Orlikowski and Baroudi 1991).

5.3 Qualitative Research Methodology

Methodology refers to the overall approach to the research design, and it should reflect the assumptions of the selected research paradigm (Collis and Hussey 2009). In this case, the research is designed as a qualitative investigation as described by Walsham (1995a), as it will be discussed in Sect. 4.4.

Quantitative methodology fails to take into account the research context and the subjective meaning of social actions (Taylor and Bogdan 1988). It has been criticised as offering only snapshots of a problem (Avital 2000) and as it can potentially ignore variables that are not included in the research model. Although it can help identify the correlations among variables, it provides little in understanding the direction of the causal relationship. These weaknesses, therefore, should be made up for by qualitative study.

Qualitative methodology is based on intensive study of all aspects of one phenomenon to see their inter-relationships. It is chosen when not much is known about the issue understudy. It can help in gaining deep understanding of the research context to develop richer knowledge of the phenomena under investigation, especially social conditions (Silverman 2010). Creswell (2009) argues that qualitative research attempts to report multiple perspectives in order to develop a holistic picture of the issue understudy. Qualitative research is appreciated by several authors (e.g. Patton 2002; Berg 2009) to explore uncovered meanings that people assign to their experiences of the issue under study. Creswell (2009) indicates that qualitative researchers often talk to the participants face to face and observes their behaviour in context. Therefore, the researchers explore and understand the meaning individuals ascribe to a social phenomenon. However, Yin (2009) has argued that qualitative researchers are often less rigorous and provide less opportunity for generalisation. Despite such shortcoming, qualitative research can be used for the study of social phenomena that do not aim at providing a general law.

5.3.1 Justifications for Using Qualitative Research

Adopting qualitative research was based on the need to align theoretical and philosophical assumptions, to maximise the ability to understand the emergent perspectives in such dynamic and complex social phenomenon and to get the rich data required. These considerations are discussed in detail to ensure and demonstrate the coherence and consistency between theoretical and philosophical underpinnings.

First, qualitative research methodology is applied to develop a rigorous consistency between theoretical and philosophical assumptions. Since the research problem is context driven, interpretive in nature and interested in understanding how things work, qualitative research is believed to be an appropriate one for conducting this research. The philosophical perspective for this empirical study is interpretive to gain "knowledge of reality" through the study of social constructions (Klein and Myers 1999). Accordingly, choosing qualitative methodology is consistent with the main aim of the framework which is the interpretation of the phenomenon under investigation. The research applies a framework based on an interpretative institutional lens that can generate understanding of the phenomenon and map key contextual and procedural factors. By using qualitative methodology, the researchers consider social properties and realities as the outcomes of social interaction, as supported by Johnson and Onwuegbuzie (2004). This is particularly a phenomenon of the IAF adaptation that is developed through the interaction between individuals and their contexts rather than something out there and developing objectively.

Second, the research examines in-depth complexities and processes in a less acknowledged phenomenon. In order to understand the dynamics of the process through which ERP systems and the IAF are co-evolving in improving the corporate governance practice, the qualitative research approach was chosen. Enterprise systems are particularly problematic to approach as an area of study, considering that their implementation and use are very much related to the organisational context in which they are embedded (Sedmak and Longhurst 2010). The qualitative study here is based on the research aim, which is to generate in-depth understanding. As previously explained in Chap. 2, there was a scarcity of empirical qualitative research and little research has examined the IAF in the context of ERP systems. Therefore, qualitative research is regarded as the most suitable option for such inquiry as this research intends to contribute to filling this epistemological gap in inter-organisational relation studies. This may allow the researcher to understand the nature and the complexity of the phenomenon under investigation. Flexibility to embrace emergent perspectives or address

un-predetermined or controlled phenomena cannot be achieved through quantitative methodology.

Third, qualitative methodology was chosen as the qualitative data provide contextual details. The qualitative methodology is therefore used here to provide contextual data (Bryman 1988). The qualitative research methodology is selected since the aim is to study issues in their natural settings, attempting to understand phenomena in terms of the meanings that people bring to them (Silverman 2010). It appears from the objectives of this book that the issues under investigation are confidential and subjective, with much contextual data are needed. Clearly, rich empirical data are required to provide more understanding. Qualitative data are collected in its natural setting, hence facilitating the effects and richness of the environment to be taken into consideration (Miles and Huberman 1994; Denzin and Lincoln 1998). Qualitative methodology allows understanding of the social and cultural contexts within which the participants work and approach them from different job positions, in order to compare and understand their viewpoints (Myers 2009). Therefore, applying quantitative methodology to the study of people is questioned and hence a qualitative approach is suggested.

So far, this research has justified the adoption of the interpretive paradigm, with the use of a qualitative methodology. The next section focuses on the selection of an appropriate research strategy for this study.

5.4 Selecting the Appropriate Case-Study Research Strategy

Having justified the use of interpretivism as an epistemological stance and the use of a qualitative research approach, this section focuses on selecting a research strategy. Remeniy et al. (2002) differentiate between strategy and tactics. While the first refers to the overall approach adopted, the second one is about the specific details of data collection and analysis. The research strategy refers to organised principles that

provide the procedure for guiding the research design and process. It describes how a given issue can be studied (Henn et al. 2006). Research methods mean the variety of techniques available to be used for data collection and analysis (Eriksson and Kovalainen 2008).

There are several qualitative research strategies that could be employed in AIS research. The choice of a specific strategy mainly depends on the research's aim and objectives (Creswell 2009). However, this section does not offer a comprehensive illustration and comparison of these strategies, but rather focuses on the case study as the most appropriate strategy for this particular research. The view of Myers (2009) is followed that the most appropriate research strategy for conducting IS empirical research following the interpretive paradigm is the in-depth case study. The following sections discuss the justifications for adopting a case study strategy.

5.4.1 Justifying the Use of Case Study

The nature of the research problem and objectives are fundamental issues that constrain the choice of the appropriate research strategy (Hessler 1992). The research strategy should be chosen appropriately to be relevant for answering the research questions (Eriksson and Kovalainen 2008). Therefore, the choice of the case study is based upon the research objectives. The case study is preferable as little is known about the phenomenon understudy, as the empirical evidence about the impact of ERP systems on the IAF is in the early formative stages and the research questions are how and why questions about events which a researcher has no control over (Benbasat et al. 1987; Yin 2009). The case study is "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin 2009, p. 18). It aims to give opportunity for diversity, complexity and avoid simplistic research designs (Eriksson and Kovalainen 2008). The case study focuses on understanding the dynamics present within single settings (Eisenhardt 1989).

The main characteristics of case study method have been identified by many authors (e.g. Cavaye 1996; Benbasat et al. 1987) as follows: it does not explicitly control variables; it studies a phenomenon in its natural context; it studies the phenomenon at one or a few sites; data are collected by multiple means; it uses qualitative techniques to collect and analyse data, and its focus is on contemporary events. Qualitative data can be collected through interviews, field notes describing observed events, papers or archives.

The IS field has witnessed a shift from technological to managerial and organisational issues. The case study is an effective IS research method, as the researchers can study IS in a real setting. The case study strategy offers the researchers the opportunity to understand the complexity of the processes taking place. It is a suitable way to investigate an area where few studies have been carried out. Case studies have become increasingly popular in IS research (Benbasat et al. 1987). There is a remarkable increase in the use of interpretative case research for investigating IS issues (Walsham 1995a). They enable examining the inter-relationship of IT with organisational activities and management practice. Orlikowski and Baroudi (1991) assert that the case study has confirmed its appropriateness to produce a sound interpretive understanding of human–technology interaction in the real social setting. Methodologically, case studies are associated with the interpretative approach (Eriksson and Kovalainen 2008). A positivist case study was rejected since it would reduce the case study to some cause and effect relationships (Orlikowski and Baroudi 1991).

In this study, the selection of a case study strategy is based on some considerations. These are to seek an in-depth understanding of the phenomenon; to meet the nature of the research questions; and to investigate and develop a mature understanding of the contextual aspects of the phenomenon.

First, the case study is appropriate when the research is conducted in the workplace and the researchers do not attempt to control any aspects of the phenomena (Collis and Hussey 2009). The case study is appropriate to investigate complex issues and to elicit intensive data regarding the area under investigation (Stake 1995). The qualitative approach used in this research is based on the ontological assumption

that reality is socially constructed. This means that it is based upon perceptions and experiences which may differ for each person and change over time and with context. Consequently, the data to be collected will be mainly rich qualitative data that capture the details of the phenomena under investigation. Furthermore, the interpretive paradigm aims to gain in-depth insight and it can be conducted with a small sample. According to Doolin (1996), the interpretive paradigm supports a less structured case study and emphasises the explanations of participants in the case.

In this research, the priority is to conduct a detailed examination of the case and utilise the rich insights into the contextual factors to enhance current understanding of the phenomenon under investigation. This study uses the case study to obtain different perceptions of the phenomena. Analysis seeks to understand what is happening in a situation of ERP systems implementation and look for patterns of IAF which may be repeated in other similar situations. ERP systems can have physical components; nevertheless, they are understood differently by different individuals and given meaning by the shared understanding which arises out of social interaction. The researchers approach the studied organisations with fewer preconceptions. The rich qualitative data gained from case studies are able to offer more insights into the complex social processes that quantitative data cannot easily reveal (Eisenhardt and Graebner 2007).

Second, to use a particular research strategy is governed by the status of research and theory about the research problem. As the research problem is in its infancy, then the case study strategy is in order (Hessler 1992). According to Yin (2009), the research questions are the main criteria to determine whether the case study is the proper technique. When the research questions are about how or why, then it is preferable to use a case study (Yin 2009).

Exploring the adaptation of the IAF through asking "how" questions, and finding reasons and triggers that are behind the event by asking "why" questions, is more associated with the use of case studies. Saunders et al. (2009) explain that the aim of exploratory studies is to describe a precise profile of persons, events or situations. The case study followed in this research can be classified as exploratory.

Third, as the boundaries between the phenomenon under investigation and context are not clearly evident, the experiences of the actors are important and the context is critical; therefore, the case study method is recommended (Benbasat et al. 1987; Yin 2009). Case study strategy seeks in-depth understanding of the context of a phenomenon, investigates a predefined phenomenon and contributes to knowledge by relating findings to generalisable theory (Cavaye 1996). The case study pays more attention to contextual factors and characteristics (Yin 2009). The case study method is appropriate for capturing practitioners' knowledge. Its design allows grasping a holistic understanding of the phenomenon under investigation (Eisenhardt 1989). This study takes the form of interpretive case study research as interpretive case study strategy tends to yield highly accurate results as it has contextual relevance. The interpretative case study is appropriate when theoretical knowledge on a phenomenon is limited or when there is a need for context capturing. However, Orlikowski and Baroudi (1991) suggest that the positivist approach dominates IS research and interpretive case studies can inform IS research.

The focus is on the IAF adaptation which is a contemporary phenomenon that should be studied within its real-life context which includes the ERP system. Interpretive case study research is undertaken because it promises a rich description of contexts. The role of case studies in interpretive methodology is to locate the IAF in its organisational contexts in order to help understanding of how the current structures and practice are shaped. In this regard, this study adopts exploratory case study research in order to understand the IAF adaptation associated with ERP implementation in an institutional governance context that shapes current auditing structures and practice.

There is further support from the literature for adopting this research method. First, several scholars have highlighted the need for more auditing case studies (e.g. Al-Twaijry et al. 2003; Arena and Azzone 2009). Second, this type of case study has been selected since little research has adopted this method for investigating the postimplementation stage of ERP studies, as highlighted in Chap. 2. There has been a call for detailed interpretive case studies of ERP system-related issues

(e.g. Caglio 2003; Kuhn and Sutton 2010). There is a lack of published scientific research regarding the IAF in the ERP systems environment as most of the IAF studies have been published by practitioners. Therefore, the case study is well suited to capture the knowledge of practitioners and apply theories to understand the phenomenon, especially in areas where the researchers are lagging behind practitioners.

In sum, to judge the appropriateness of the case study method, Benbasat et al. (1987) suggest a number of questions. Can the phenomenon of interest be studied outside its natural setting? From the previous discussion, it is clear that the IAF in the ERP systems working environment cannot be investigated outside its context. Must the study focus on contemporary events? It is evidenced in the literature that most of the organisations that started to implement ERP systems have just entered the postimplementation stage and start to face new problems. Is control or manipulation of subjects or events necessary? There is no need to control any variable in the research area as the aim of the research to get the practitioners' experience and their natural response to the problems they face in that context. Does the phenomenon of interest enjoy an established theoretical base? It has been clear from the literature review that there is no study that has looked at this problem. Therefore, there is no theoretical base for studying this phenomenon. Thus, for all these reasons reported thus far, the author claims that case study strategy is appropriate for the research presented in this dissertation.

5.4.2 Overcoming the Limitations of Case Study

Even though the case study is a distinctive type of empirical inquiry, field research is not without its limitations. Generally, researchers have no control over independent variables during the case study that may limit the internal validity of the conclusion. One more limitation is related to the interpretations of case study reports. However, it is recognised that there is no reality that can be uncovered away from the practice of its representations: "there is no such thing as a truly 'correct' and 'balanced' case study—that two researchers are likely to produce two

different case studies from visits to the same organisation" (Humphrey 2001, p. 97).

Additionally, one of the criticisms of the case study method, that cannot be dismissed, is related to the risk of bias, which is a common criticism of field studies (Yin 2009). The potential bias is avoided as far as possible in this research by data triangulation through cross-checking data with organisation records and descriptions from other individuals. In addition, developing good relationships with some of the interviewees to build trust and cooperation reduces any tendencies on their part to misreport events in ways that would favour either the organisation or themselves.

The main limitation of the case study strategy is that the data gathered are related only to the case under research. In addition, case research may set up relationships between variables but cannot point out the direction of causation (Cavaye 1996). They do not provide unproblematic facts regarding absolute reality; therefore, they lack external validity. Therefore, it is difficult to justify the findings statistically (Smith 2003); however, case research result generalisations are made for theory not for populations (Yin 2009).

Some verification strategies are followed in a rigorous fashion to assure the credibility (internal validity), the transferability (external validity) and to mitigate the risk of bias such as member checks when coding, categorising and confirming results with participants. This is explained in Sect. 4.7.5. Despite the case study limitations, the data collected from a case study are richer in details and insights (Smith 2003). Case study method is selected as a proper research method for the study, and the unavoidable weaknesses of case research are accepted as method-related limitation of the research.

5.4.3 Single- or Multiple-Case Studies

Case study research strategy is versatile and can investigate single or multiple cases, depending upon the underlying philosophical assumptions of the researchers (Myers and Avison 2002). A single case is often selected when the case is both an exemplary case containing unique

circumstances and a revelatory case being one of the first examinations of the phenomenon (Yin 2009). Therefore, in the light of the characteristics of this research, a single-case study will not be appropriate.

Dismissing a single-case study approach suggests that multiple cases prove more appropriate for the research proposed in this book. Studying multiple cases makes it possible to build a logical chain of evidence (Miles and Huberman 1994). Additionally, Benbasat et al. (1987) state that a multiple-case study provides more general results than a single-case study does. The analytical conclusion derived from a multiple-case study is more robust, as it moves the investigation from one context to another, thus isolating idiosyncrasies that contribute to exploring the phenomenon (Yin 2009).

Interpretive studies use more than one case without loss of depth and rely on the richness of their descriptions to support their validity (Doolin 1996). A multiple-case study allows comparisons which can show that the research results are not idiosyncratic to a single case but are consistently replicated by several cases (Eisenhardt 1991). Constructs and relationships can be more accurately explained since it is easier to find out precise definitions and appropriate levels of construct abstraction from multiple cases (Eisenhardt and Graebner 2007).

5.4.4 Purposive Sampling

The sampling logic where a selection is made out of a population is improper in case study research (Yin 2009). Eisenhardt (1989) states that the "random selection of cases is neither necessary, nor even preferable". Theoretical sampling is appropriate which means that cases are chosen for the reason that they are mainly suitable for revealing relationships and logic among constructs. Cases are selected when they will be likely to offer findings confirmation by insight replication from other cases or offer different findings by contrary replication (Eisenhardt and Graebner 2007). Therefore, replication logic is used as a base for the multiple-case study in this research. A multiple-case study strengthens the findings through replication and increases confidence in the robustness of the results. The selection of each case is done according to literal

replication that predicts similar results for expected reasons, or theoretical replication that provides different findings for expected reasons (Yin 2009).

The cases selection was purposeful, involved in the use of replication logic and largely depended on the conceptual framework developed based on prior theory (Perry 1998). Patton (1990) lists some strategies of purposeful sampling. Of these strategies, maximum variation sampling focuses on extreme cases that are used to observe contrasting patterns in the data. This leads to clear pattern recognition of the central constructs, relationships and logic of the focal phenomenon (Eisenhardt and Graebner 2007). Other types of purposeful sampling include the "typical case". For this study, the selection of the cases was a purpose-based selection as the intention was to study a specific organisational situation with the characteristics of: being big enough to have an IAF and having implemented ERP systems within the last year at the maximum. Two are manufacturing companies and two large banks operating in Egypt, where one of each pair is international and the other is national. This was to apply the literal replication and theoretical replication suggested by Yin (2009). Therefore, purposive sampling was used as the most appropriate method when doing cases study as it satisfies the literal replication that could be typical cases and theoretical replication that could be contrasted cases.

Generally, there is no ideal number of cases that should be conducted when using multiple-case study. Romano (1989) suggested that determining the suitable number of cases should be left to the researchers. However, Eisenhardt (1989), Lincoln and Guba (1986) suggest that cases should be added to reach the theoretical saturation level or to the level of redundancy, but this neglects the constraints of time and budget.

There is no exact rule to determine the number of cases to be conducted (Perry 1998). Moreover, Patton (1990) claims that "there are no rules" for sample size in qualitative research. Irani et al. (1999) do not provide an exact number or range of cases that could serve as guidelines for researchers. They argue that the number is mainly up to the researchers' discretion and depends on the research aim and questions. Therefore, determining how many cases should be studied depends

on what is known about the phenomenon after conducting a case study and on the new information likely to come out from studying more cases. Research questions and data to be collected are at the core in determining the suitable number of cases and at what point the researchers have studied sufficient cases to enable appropriate analysis (Eisenhardt 1991). There is no single rule regarding the minimum number of cases that should be used for a multiple-case study (Eriksson and Kovalainen 2008). Eisenhardt (1991) suggests that multiple-case design requires the study of between four and ten cases. Creswell (2009) counters this suggestion and argues that a researcher should typically choose no more than four cases in order to capture the context where the phenomenon occurs in much more detail. As such, the research in this book employs the use of a multiple-case study within the limits suggested by (Eisenhardt 1989; Creswell 2009).

In this study, access to the organisations and the willingness to cooperate were gained through personal contacts. For each organisation, a main individual was identified and e-mails were sent to explain the research objectives, to highlight the importance of the research and to request participation. This is according to Lewis (2003, p. 62), who recommends having a single point of contact within the selected organisations to avoid duplications of communication. In accordance with the suggestions of Voss et al. (2002), the main individuals were senior enough to ease the access and to recommend the best interviewees who are able to provide the required data. Later on, those individuals were contacted to find out the willingness of their organisations to participate.

The multiple-case study consists of the comparative in-depth examinations of four organisations. The study uses a multiple-case study to cover the theoretical replications of the studied phenomenon across Egyptian national organisations and international organisations working in Egypt. Therefore, two individual cases within each category were conducted, so that the theoretical replication was complemented by literal replications. To assist with the comparability of data, it is decided to restrict the organisations selected to only two industries. These are in the banking and the manufacturing sectors. The first case study was used to help set the boundaries of the study.

When investigating an organisation-level phenomenon, the site selection is based on the characteristics of organisations. These may include the industry, geographic coverage and the specific technologies in which the researchers are interested (Benbasat et al. 1987). Accordingly, the sites of the cases were from the banking and manufacturing sectors. The banking sector plays an important role in the national economy, and imbalance in this sector was the main reason for the financial crisis. Moreover, the banking sector is always a subject of corporate governance rules and regulations from different institutions locally and internationally. In addition, the IAF gains a great deal of attention as a corporate governance tool in modern banks. Thus, the banking sector has been chosen for conducting the case studies. Moreover, ERP systems are widely used and are more mature in the manufacturing sector.

Geographically, there was a debate that the ERP systems are designed in the developed countries and organisations in the developing countries often face some misalignment issues between the system characteristics and the working environment. Therefore, a comparative study between the IAF in international organisations and national organisations in one of the developing countries (Egypt) increases our knowledge about this issue and our understanding of the IAF adaptation as a response to ERP systems introduction. The Egyptian context is a particularly significant and interesting setting for two reasons. First, Egypt is one of the Middle East countries where about 70% of IT spending is on ERP systems (American Chamber 2002). ERP systems, as a complex IS, face some challenges in developing countries taking into account infrastructure challenges and the specialised knowledge needed that rarely is available locally (El Sayed 2006). Second, there is a great deal of attention given to the corporate governance practice and mechanisms in Egypt. Egypt responded to the growing concern about corporate governance in recent years by reforming the Corporate Governance Egyptian Code that includes a number of rules that focus on various aspects of corporate governance, especially an internal audit department. These points make the findings of this study different from those of other case studies conducted in more advanced countries.

Finally, as the study is interested in the IAF adaptation after ERP system introduction, specifically, the cases were conducted in organisations which have implemented the ERP systems within no more than 1 year.

Using multiple cases enables validating and cross-checking of the findings. This approach treats each case as a separate test of the initial proposed conceptual framework presented in the Chap. 3. This is to achieve analytical generalisation through the replication logic rather than sampling logic where each case is comparable to a new experiment (Eisenhardt and Graebner 2007; Yin 2009). Additionally, multiple cases provide more compelling evidence than a single case and increase the robustness of the research findings (Eisenhardt 1989; Irani et al. 1999; Yin 2009).

In this study, the theoretical saturation concept was followed to limit the number of cases conducted to four. No further cases were added when the latest case conducted did not add new insights to the research inquiry compared to the early ones.

5.5 Empirical Research Process Design

Empirical research design is a cohesive and logical process that involves the collection, analysis and interpretation of research data (Yin 2009). The whole research process is divided into three main stages. The first stage is the formulation of the idea and developing the "what" question about the research. The second stage is the data collection stage and "*how*" to conduct the field study. The final stage is the analysis of the collected data and the interpretation of the "*why*" question about the phenomenon. The following subsections discuss the design and the process of the investigation that the researchers have undertaken, to collect and analyse the fieldwork data. They address the process design, data collection and data analysis methods.

The starting point was to review the relevant literature to develop the necessary understanding of the research area under investigation. As the research is classified in the AIS field, an integrative approach, based on a multi-disciplinary review of the literature in the auditing and IS disciplines, helped in developing an in-depth understanding of the

phenomenon under study. This led to a specific research area and ultimately identified a research need. The initial finding from this review was the need to bridge gaps in knowledge in terms of the IAF adaptation in response to the ERP systems introduction. Thereafter, a conceptual framework was developed to represent and focus on the intended empirical research. It was decided that the research design would apply a qualitative multi-cases study strategy. The research design was transformed into a protocol, wherein qualitative data collection methods were developed to gather data required based on defined units of analysis. The method was in the form of an interview agenda (see Appendix B), that is, a set of questions to guide the researchers during the semi-structured interviews. In addition to the interviews, data were collected through several sources like focus groups, observations and archival documents, internal reports, consultancy reports and the website of the organisations. The use of multiple-data collection methods makes data triangulation possible (Eisenhardt 1989).

5.5.1 Choosing Case Study Companies

Selecting a particular type of case study design is guided by the overall study aim. Yin (2009) classifies case studies as explanatory, exploratory or descriptive. He also differentiates between single, holistic and multiple-case studies. This research aims to explore situations where the interventions being evaluated have no clear, single set of outcomes and to explain why particular outcomes occurred. The case study analysis seeks to identify the multiple inter-linked factors that have an effect on the IAF and compares what is found in the case to theory from literature. Therefore, the most suitable type of the case study design is exploratory research (Yin 2009). Because comparisons will be drawn, it is imperative to use multiple-case study design. The examination of four cases was conducted to understand the similarities and differences between the cases. The cases were chosen carefully so that similar results within each pair of cases can be predicted (a literal replication) and contrasting results across each pair of cases (a theoretical replication) (Yin 2009). Four case studies were conducted in Egypt. Data were gathered from

two manufacturing companies and two large banks operating in Egypt, where one of each pair is an international and the other is national. These cases have been selected because of a combination of accessibility and representativeness. A multiple-case study enables the exploration of differences within and between cases. The goal is to replicate findings across cases. Overall, the evidence produced using this type of study is considered robust and reliable; however, Baxter and Jack (2008) suggest that this can be time-consuming and expensive to conduct.

The case study started without propositions as Miles and Huberman (1994) suggest that propositions are not presented in exploratory case studies where there is not enough experience, knowledge or information from the literature upon which to base propositions. However, Miles and Huberman (1994, p. 18) suggest that the conceptual framework can help in identifying who will be included in the case study, describing what relationships will be presented based on theory and gathering constructs into intellectual bins. Therefore, the conceptual framework will be referred to again at the stage of data interpretation.

It is important to consider some other components required for designing a rigorous case study. These include identifying unit(s) of analysis and the criteria for interpreting the findings (Yin 2009).

5.5.2 The Unit of Analysis

The unit of analysis is the level at which the research is conducted and which objects are researched (Blumberg et al. 2011).This research uses multiple units of analysis:

- The organisational level of analysis is used to understand the corporate governance external pressures related to the IAF. The analysis of the organisational level in the international organisations focuses only on the unit of the organisation located in Egypt, while the whole organisation is analysed in the national cases.
- The sub-organisational level is used where the IAF is the unit of analysis to understand how ERP systems affect it in the micro-level. The IAF means different things to different organisations. For the

purpose of the analysis, the IAF is given the widest meaning in terms of the claim made by the IIA that it should cover effectiveness, efficiency of operations and compliance with laws. Therefore, all practices which are undertaken to assure that control procedures are followed will be regarded as internal audit activities for the purpose of the study. The result is that the study has not taken a narrow view of the role of the internal auditor. It accepts persons who conduct surveillance to ensure that procedures that protect organisations from a physical loss that would lead to financial loss are included as internal auditors.

In order to avoid attempting to address a topic which has too many objectives for one study, some authors have suggested that placing boundaries on a case can prevent this. Suggestions on how to bind a case are by time and activity (Stake 1995) and by definition and context (Miles and Huberman 1994). In the current study, established boundaries would depend on a concise definition of the IAF and ERP systems.

5.5.3 Case Study Protocol

Despite the increasing calls for using the case study in AIS research, there are few guidelines on how to develop a case study protocol (Maimbo and Pervan 2005). A case study protocol is a set of guidelines that outlines the procedures governing the research before, during and after case research. A protocol ensures uniformity where data are collected in multiple sites (Eisenhardt 1989). Such a protocol is necessary to increase the consistency and focus of the data gathering process. When the empirical inquiry is subjective and seems to depend on irregular data gathering tools, then a scientific map must be developed so other researchers can trace the data collection path which was followed (Irani et al. 1999).

The developed case study protocol assists in detailing in advance the procedures that are followed during data collection. It provides direction to improve and emphasise the reliability of the case study research findings. According to Yin (2009), the essential components of the case

study protocol include an overview of the study, the field procedures to be followed and interview questions. During the development stage, the case study protocol is reviewed by some potential participants in order to get feedback regarding its structure, content and usability. This tactic is used to ensure that the research utilises terminology that participants are familiar with. Feedback is used to refine the case study protocol. The core of the case study protocol is the interview agenda (see Appendix A) that sets all the questions to be asked in the interviews. This allows other researchers to replicate the study and obtain similar results (Yin 2009).

5.5.4 The Role of the Researchers

The contextual complexity in studying IS in organisations and the need to interpret IS-related activities in the context of other organisational activities requires a deep understanding (Doolin 1996). According to Walsham (1995a), there are two roles for a researcher: to be an outside observer or to be an involved researcher. In this book and given the data collection methods, it could be said that the position of outside observer is adopted. Even though this position involves some distance from the interviewees, it gives them more opportunity to express their views more freely once a rapport of trust is established. Nonetheless, one of the main disadvantages of this adopted role is the difficulty in getting access to certain issues which are considered as confidential or sensitive to share with outside observers.

5.6 Data Collection

Qualitative research methods, illustrated by Walsham (1995a, b), are used to conduct the study. These include in-depth semi-structured interviews and illustrative materials. Evidence from several sources is collected to support the research results. It is a strategy which enhances data credibility (Yin 2009). The target is to obtain a rich set of data about the research issue and to capture the contextual complexity. Prior

to the main data collection, four pilot interviews were conducted to provide preliminary insights and to examine the agenda of the interview questions. The pilot informants were two academics who are specialists in the AIS field, one an ERP consultant and one a certified internal auditor. Additionally, the pilot interviews helped with refining the data collection plans. The interviewees were invited to comment and provide suggestions regarding any ambiguity on the wording of the interview questions. The questions are tried out before moving ahead with the research to find out: Do the questions extract the right information? Do they secure detail and meaning? Do they get individuals to open up? Are they well sequenced and topically ordered? As suggested by (Hermanowicz 2002), furthermore, these pilot interviews were proved to be useful in gaining feedback from practitioners prior to undertaking the main empirical study.

5.6.1 Triangulation

Triangulation when doing a case study is very important, as Yin (2009, p. 199) argues that "any case study finding or conclusion is likely to be more convincing and accurate if it is based on several different sources of information". There are several different types of triangulation, and data triangulation refers to the process of using multiple-data collection techniques within one study to check the validity of the data derived (Yin 2009). Data triangulation is to study the same phenomena at different times, with different participants and in different locations. According to Flick (2008), data triangulation helps in verifying facts through multiple-data sources. Moreover, data triangulation improves the quality of data and consequently the robustness of the findings (Myers 2009).

Data were collected from multiple sources, which are highly recommended by many researchers (Miles and Huberman 1994) as a mechanism for increasing both the reliability and validity of qualitative research. The research uses more than one source of data such as interviews, focus groups, observation and document analysis. Data triangulation through using a multiple-case study added value to the research

and its findings. Data triangulation offers the cross-validation of data obtained from different sources. Furthermore, data credibility was verified through depending on a multiple-informants design for the semi-structure interviews. This allows viewing research points from more than one perspective. Interviewing different people within an organisation aimed at the triangulation of subjects, where the idea is not to force one voice to emerge, as suggested by Myers and Newman 2007. This also helped to reduce the bias of interviewing only the prominent individuals in an organisation (Miles and Huberman 1994). The study also made use of triangulation within methods by combining two strategies of questioning within the semi-structured interview through the combination of narrative semantic questions and descriptive and argumentative questions. The research uses content analysis through bringing together strategies proposed by (Miles and Huberman 1994; Hsieh and Shannon 2005; Yin 2009; Zhang and Wildemuth 2009).

The techniques used to apply triangulation are: using a multiple-case study; multiple-informants; cases and participant sampling triangulation through purposive sampling and snowball sampling; generating data through semi-structured interviews, observation, documentation and archival record review; combination of narrative semantic questions and descriptive and argumentative questions and using combination of perspectives to conduct the content analysis. The empirical evidence is gathered using multiple-data collection methods which are outlined below.

5.6.2 Semi-structured Interviews

Given the research aim, interviews are considered to be the most useful data source for gathering the interviewees' interpretations of changes which are taking place in relation to the IAF. This study involves determining the structure and the practice of the IAF within ERP-based organisations. Therefore, interviewees were chosen to cover the stakeholders of the IAF and ERP systems. The interviewees encompass, for instance, internal and external auditors, ERP vendors and managers, consultants and IT professionals. The IAF encompasses a broad range

of activities. Usually, individual organisations would have arranged these activities for their own convenience; therefore, the activities may often be segregated within the organisation and not viewed collectively as part of the IAF. As a result, a formal questionnaire without detailed guidance would be unlikely to yield a valid result. For this reason, a detailed semi-structured interview using open-ended questions was necessary. A form of semi-structured interview is considered to be the most appropriate method by which the main body of data is gathered. The reporting media is an important concern in interviewing. Note taking complemented with tape recording where possible is a reasonable approach (Walsham 1995a).

The qualitative interview is a very effective data gathering technique. The unstructured or semi-structured interview is the most used type in qualitative research in the IS field (Myers and Newman 2007). The semi-structured interview is among the most fundamental methods and one which brings a closer understanding of people and their social worlds (Hermanowicz 2002). Regarding interpretive case studies, interviews are the most important sources of data (Walsham 1995a). The interpretive studies use less structured interviewing techniques to encourage participants to express their own views without influence from the interviewer's preconceptions (Doolin 1996). Moreover, Eriksson and Kovalainen (2008) argue that semi-structured interviews are appropriate for answering open-ended questions, especially what and how types of questions that are common in the interview agenda.

Using interviews as a data collection method reflects the ontological and epistemological stance of the researchers and serves to maintain the consistency and coherence of the research structure. From an ontological perspective, the experience, understanding and interpretations of the interviewees are the components of social reality; therefore, the proper way to understand social reality is to explore these dimensions. From an epistemological perspective, using the interviews generates data, accesses people's experience and understanding through interactive approaches that allow the flow of participants' interpretations. In this study, analysing contextual factors implies choosing interview methods that have the ability to extract comprehensively the complexity of the phenomenon.

To mitigate bias in the interviews, many highly knowledgeable informants who view the focal phenomena from different perspectives are interviewed, as suggested by Eisenhardt and Graebner (2007). Individual, in-person semi-structured interviews with individuals from different hierarchical levels such as internal auditors, CIA, IT professionals, top managers, external auditors, consultants and ERP vendors were conducted at the selected organisations, using a two-part questionnaire as a guide. The first section included questions designed to gather general information about each organisation. The second section focused on the IAF, with the purpose of exploring its corporate governance rules that govern it and the impact of the ERP system implementation on its structure and practice. Participants were not asked to fill out a questionnaire; instead, it was used as a guide to direct and structure the open-ended interviews.

Prior to the fieldwork, the interview questions were reviewed and checked by four academic and professional experts, two academic experts in internal auditing and ERP systems and the others were one from the internal audit profession and one ERP professional expert. The interview schedule (see Appendix B) provided a guide for the interviews. Probes and prompts were used to clarify or expand responses. Each interview lasted 60–90 min, and the questions were grouped into themes. This aided the logical flow when collecting and analysing the data. Prior to the interviews, participants were notified of the aim and the general objectives of the study. In the beginning of the interview, the purpose of the interview and what was expected to be achieved were clearly explained and interviewees were reassured that no attribution would be given to their views in any subsequent discussion or reports. The interviews were steered carefully to the purpose of the study, while avoiding over-directing the interviewee. Interviews were usually conducted in the interviewee's office, which facilitated the access to the relevant documents if the interviewee needed to check details or share related materials. Five of the participants from different cases preferred to have the interviews in a café as sit provided an informal and relaxed setting. All the interviewees spoke English, but some felt more comfortable answering in a mixture of Arabic and English.

The interviewees were asked for permission to call back to check any further matters and for giving feedback, as recommended by Myers and Newman (2007). As suggested by Hermanowicz (2002), the interviews were recorded and subsequently transcribed. This made it possible to listen to the interviews many times and extract direct quotations to support arguments. Three participants did not agree to being recorded, and in these cases, an effort was made to ensure making a complete set of notes.

Follow-up interviews were conducted using a combination of face-to-face and telephone interviews. Particular effort was made to interview individuals originally involved in the ERP system implementation as well as those persons managing its maintenance.

5.6.2.1 Purposive Sampling for Participants

The purposive sampling technique is highly recommended for qualitative case study research (Neuman 2003). It has been used to identify key participants. The purposive sample consists of selected individuals who have particular features or characteristics that enable a detailed understanding of the phenomena understudy. Interviews were the main data sources; therefore, selecting the interviewees and justifying this selection were critical steps and were an integral part of the case study protocol. Because the unit of analysis was the IAF, the focal participants were individuals involved in the function and its contextual factors, ERP systems and the governance pressures.

5.6.2.2 Snowball Sampling

This study combines purposive sampling with snowball sampling. Snowball sampling "is commonly used when it is difficult to identify members of the desired population" (Saunders et al. 2009, p. 147). The snowball sampling technique was employed in order to gain access to further participants. Initially, the data were accessed through purposive sampling and selection of the key participants. Gradually, further participants were accessed through key participants recommending

other participants who might be willing to participate and met the criteria of the research objectives. In turn, these new participants were asked to recommend others who could enrich the investigation and provide important data. Within each organisation, the data saturation criterion was followed to decide when enough participants had been interviewed and data were gathered to the point that nothing new was being added.

5.6.3 Focus Groups

Focus group is a form of group interview that explicitly utilises the interaction between research participants as part of the method to generate data (Kitzinger 1995). It is useful to explore how participants describe their thoughts and to uncover important factors (Kitzinger 1995). Focus groups encouraged participation from people reluctant to be interviewed on their own also encourage the participation of those who are anxious about talking. To establish the right atmosphere, focus groups were in a comfortable setting with group size between four and six people. The researchers started by explaining the aim of focus groups. Participants were encouraged to talk to each other and comment on others' experiences and points of view. The focus groups naturally occurred from people work together. Only three focus groups were conducted, two of them were conducted with the IT team within organisations, and the third was conducted with external IT auditors.

It was important to consider the hierarchy within the group not to affect the data. An advantage of having a focus group of colleagues in the same department was that they related each other's comments to incidents in their shared tasks. These groups ensure discussion among participants sharing same ideas in order to reduce the risk of clashing ideas. They challenged each other on contradictions between what they express to believe and how they actually behave. The researchers urged debate to continue and encouraged the group to discuss further the inconsistencies. Disagreements within groups used to encourage participants to clarify their point of view. Each group discussion session lasted between an hour and an hour and half. Discussions were tape-recorded

and transcribed. Focus groups analysis was conducted using the same method as other qualitative data.

5.6.4 Documentary Evidence

Documents are useful for making inferences about events. Yin (2009, p. 103) states that "because of their overall value, documents play an explicit role in any data collection in doing case studies. Systematic searches for relevant documents are important in any data collection plan". Collecting documents is regarded as an important means of data collection in qualitative studies. There were many types of document which were found to be helpful and interesting for this study and which added value to its data collection phase. The documents reviewed include published interviews with key informants, newspaper and journal articles and written reports of events. Some sorts of documentary evidence related to the ERP systems and the IAF within each organisation were collected and analysed. These included:

- Corporate governance rules and regulations relating to the IAF structure and practice.
- The Basel Committee standards relating to internal control and risk management in banks.
- Internal audit reports, consultant reports and documents from the ERP vendor which clarify the auditing tools included in the system.
- annual accounts and external audit reports.
- Job descriptions of the internal audit and the brochures of the IT department, risk management department and organisation' and other internal documentation that was needed to provide background information about the organisation.
- Data from the organisation's website, press releases and other public sources of information (used to corroborate the evidence from other sources).
- Selected materials from training and workshop sessions provided by the ERP system vendors.

These materials helped develop a rich knowledge about the phenomenon under study.

5.6.5 Observation

In addition to the interviews and documentary evidence, data were gathered through the observation of a number of internal auditors in their interaction with ERP systems. In some cases, internal auditors can demonstrate practically how they can tell whether there is something wrong with the system, what they are getting out of the system and explaining how the output of their work differs from, or is similar to, the systems that were in place prior to the ERP systems.

Observation is used as a method to collect data, motivated by the need study the working environment, the communication between partners and the means of interaction. The researchers visited the organisations equipped with a notebook and recorder, to describe accurately the working environment. Observation was unstructured as suggested by Bryman and Bell (2007). The observation was found to be a useful means of collecting data. For example, in the national bank, the researchers noted that the risk management department was located in a different building than the IAF, while they are located in the same floor in the international bank. This suggests that there was more interaction and collaboration work between those departments at the international bank than at the national bank. Additionally, at the international company, the researchers took notes of some posters in the internal audit department highlighting for the team the importance of integration in working on and in accomplishing any audit task. Eventually, observation technique was applied to maximise the triangulation in this study, which resulted in enriching the collected data and enhancing the research reliability and validity. In addition, some informal conversations were conducted as opportunities came along. This technique is useful for providing extra information about the area being studied.

5.7 Data Analysis

One drawback to using qualitative data is that the methods of analysis are often not well formulated (Miles and Huberman 1994) and most methods depend on the researchers' skills to observe themes within data (Oates 2006). According to Rowley (2002) the principles for analysing data from multiple-case studies are to:

- make use of all related evidence
- consider all the major rival interpretations
- Address the most significant aspects of the case study in the analysis, drawing on prior knowledge in the area of the case study but in an unbiased manner.

A review of the various methods of analysis was conducted to determine an appropriate technique. To structure the complex task of analysing the significant amount of qualitative data, a process of qualitative analysis is used utilising guidelines of the qualitative content analysis (Miles and Huberman 1994; Yin 2009; Zhang and Wildemuth 2009). Based on these recommendations, this study has built a plan of analysis and data processing practice. The process applied in this research first uses Miles and Huberman's (1994) ideas as a general strategy as analysing qualitative data consists of "data reduction, data display and conclusion drawing" (p. 10), combined with Yin's (2009) advice in analysing the case study and the detailed steps of qualitative content analysis suggested by Zhang and Wildemuth (2009).

5.7.1 Qualitative Content Analysis

In this study, the qualitative content analysis technique was followed in order to understand the nature of the phenomenon understudy and interpret the themes of the participants. This technique is deemed the desirable one for this study as it helps to preserve the deep meaning of the qualitative data. Furthermore, it enables the interpretation of all

transcribed interviews, documents and observations to gain a holistic view of the phenomenon.

Content analysis has been defined as a systematic, replicable technique for compressing many words of text into fewer content categories based on obvious rules of coding (Weber 1990; Krippendorff 2004). Content analysis is a widely used qualitative technique (Hsieh and Shannon 2005). Content analysis is used to interpret meaning from the content of text data. Qualitative content analysis has been defined as "any qualitative data reduction and sense-making effort that takes a volume of qualitative material and attempts to identify core consistencies and meanings" (Patton 2002, p. 453). Qualitative content analysis extracts objective content from text data to examine themes which are manifest or latent. This type of analysis allows researchers to understand social reality in a subjective but scientific manner (Zhang and Wildemuth 2009).

Qualitative content analysis uses inductive reasoning, by which themes and categories emerge from the data (Zhang and Wildemuth 2009); however, qualitative content analysis does not need to exclude deductive reasoning (Patton 2002). Hsieh and Shannon (2005) discuss three approaches to qualitative content analysis, based on the extent of inductive reasoning used. The approach followed in this study was directed content analysis, in which initial coding starts with a theory and relevant research findings. Then, during data analysis, researcher is immersed in the data and allows new codes to emerge from the data. This method is used because the purpose of this approach usually is to validate a conceptual framework (Hsieh and Shannon 2005). This approach helps to guide the analysis and interpretation with certain expectations, while allowing aspects to emerge from the empirical data, which differ from what is in the conceptual framework.

5.7.1.1 Prepare the Data

In the analysis process, data gathered from multiple sources were brought together rather than handled separately. Each data source contributed to a greater understanding of the entire phenomenon and

strengthened the findings. In order to start data analysis, all materials were prepared for analysis by being in the same format. The data were transformed into written text before analysis started. Audio tapes of the recorded interviews were transcribed. Complete transcripts were prepared where all the answers to the questions from the interview guide were literally transcribed in verbalisations. The translation process from Arabic to English language was included in the transcribing process. Most of the raw data are irreplaceable, so a copy of all the data was made. Since data analysis is done with the aid of a computer, backups of analysis work were made, as suggested by Oates (2006).

To help filling and sifting the material, within-case analysis starts off by readying all data to get a general impression and to identify key themes in the data. Initially, three themes were used (Oates 2006):

- Sections have no relations to the research purpose so are not needed.
- Sections provide general information that is needed to describe the research context (for example, history of the organisation, number of employees, location and time respondents have spent in their current job).
- Sections relevant to the research questions. Each unit of data on this third type is to be coded and categorised.

5.7.1.2 Define the Coding Unit

Defining the coding unit is one of the most fundamental and important decisions in the qualitative content analysis (Weber 1990). The coding unit of analysis means the basic unit of text to be classified during content analysis (Zhang and Wildemuth 2009). This study has used individual themes as the coding unit of analysis to do qualitative content analysis, rather than the word, the sentence or the paragraph which are mostly used in quantitative content analysis. A theme could be expressed in a single word, a phrase, a sentence, a paragraph or an entire document. Therefore, a code can be assigned to a text chunk of any size, as long as that chunk represents a single theme or issue of relevance to the research questions.

5.7.1.3 Develop Categories and a Coding Scheme

To use the reduction analytical technique, which helps in developing a clearer picture of participants' responses (Miles and Huberman 1994), a list of data codes was established based on the conceptual framework and modified during the analysis. The data reduction is "the process of selecting, focusing, simplifying, abstracting, and transforming the data that appear in written-up field notes or transcriptions" (Miles and Huberman 1994, p. 10). This step started during the data collection, transcription and coding stages. The qualitative content analysis technique was particularly rich and meaningful because of reliance on coding and categorising of the data. Weber (1990, p. 37) stated that "A category is a group of words with similar meaning or connotations". With the directed content analysis approach, analysis started with the conceptual framework based on the theory or relevant research findings as guidance for initial codes (Hsieh and Shannon 2005).

It has been suggested (Rowley 2002) that in exploratory study it is good practice to develop a framework as an analytical strategy for organising the case study. A framework was developed for each section to reflect the themes. Evidence was gathered within relevant themes, analysed and compared in these categories. This was done to get a description that can be corroborated from multiple sources of evidence (Rowley 2002). The coding scheme and categories were based initially on the conceptual framework themes and sub-themes. This approach was indeed helpful for the data reduction stage. It directed the efforts of the analysis towards the research questions and objectives. Data were coded based on the conceptual framework because "conceptual frameworks and research questions are the best defence against overload" (Miles and Huberman 1994, p. 55). An initial list of coding categories was generated from the framework and modified within the course of the analysis as new categories emerge inductively (Miles and Huberman 1994). Qualitative content analysis allowed assigning a unit of text to more than one category simultaneously (Zhang and Wildemuth 2009). The categories in the coding scheme were defined in a way that they are

as internally homogeneous as possible and as externally heterogeneous as possible (Lincoln and Guba 1994).

This technique of the conceptual thematic analysis was facilitated by the existence of the conceptual framework that encapsulated the predefined themes generated from the literature review. A new set of themes were revealed through iterative recoding and analysis. This fulfilled the task of data reduction through having a clear research design as a means to analyse qualitative data. This is an appropriate strategy as Yin (2009, p. 36) states that "the complete research design will provide surprisingly strong guidance in determining what data to collect and the strategies for analysing the data is an essential step when doing case studies". The detailed coding scheme can be found in Appendix C.

5.7.1.4 Test the Coding Scheme on a Sample

To use a standardised process in analysis, the coding scheme was developed and validated at the early stage of the analysis process. To test of the clarity and consistency of category definitions, a sample of data was coded (Zhang and Wildemuth 2009). The coding consistency was checked through an assessment of inter-coder agreement. Coding sample text, checking coding consistency and revising coding rules are iterative processes that continue until sufficient coding consistency is achieved (Weber 1990).

5.7.1.5 Code All the Data

When sufficient consistency has been achieved, the coding rules were applied to the entire texts. During the coding process, the coding was checked repeatedly. New themes and concepts were revealed and added to the coding scheme.

5.7.1.6 Assess Coding Consistency

After coding the entire data set, the consistency of coding was rechecked as new codes had been added since the original consistency check.

5.7.1.7 Draw Conclusion from the Coded Data

This step involved making sense of the themes or categories identified and their properties. Meanings derived from the data were inferred and reconstructed. Properties and dimensions of all categories were explored to identify relationships between categories. Theoretical replication was the key to the rigorous analysis of the case study data (Perrys 1998). Within-case analysis precedes cross-case analysis (Miles and Huberman 1994). Within-case analysis is descriptions; however, it is essential to build up familiarity with case data as stand-alone. A diagrammatic display of information about each case was used. Yin (2009) has offered some strategies for analysing case data. One is to analyse the evidence based on developing a case description and cross-case synthesis techniques.

5.7.2 Within- and Cross-Case Analysis

Within-case analysis is the analysis of each individual case with a comparison with the research's frame of reference, while the cross-case analysis is to find similarities and strengthen understanding through such cross-case comparisons (Yin 2009; Miles and Huberman 1994). A case summary is a single document created for each case to collate all participants' individual responses to each question to facilitate comparative analysis. This summary facilitated the production of case reports. Therefore, transcripts and response summaries were useful for within-case analyses and case reports for cross-case analyses, respectively.

Cross-case analysis allowed each case's unique result to appear before generalising across cases. Additionally, the rich familiarity of the researchers with the data of each case accelerated cross-case comparison (Eisenhardt 1989). Eisenhardt (1989) has suggested three strategies for cross-case analysis: the first one which was applied is to choose dimensions and then look for within-group similarities coupled with inter-group differences. Dimensions were suggested by the conceptual framework which was built based on existing literature.

Data analysis across cases verified that findings are not just the result of idiosyncrasies of the research setting. Cross-case comparison represents an approach to cross-case analysis. Across cases comparison depended on relating changeability in context to constancy in process and outcomes using the logic of literal and theoretical replication (Yin 2009). Literal replication expects a second case, which has a similar context, to give similar findings for process and outcome. Theoretical replication compares cases which are different in context, expecting to find different outcomes (Cavaye 1996). The research design was a multidimensional blend of theoretical and literal replication as suggested by Perry (1998).

5.7.3 The Role of Theory

The incentive to use theory in the early steps of interpretive case studies was to formulate an initial conceptual framework. This framework takes account of previous knowledge and forms a rational theoretical basis to inform the empirical work (Walsham 1995a). The study uses institutional theory to study the IAF adaptation as a response to the technological influences after implementing ERP systems. The manner in which organisations respond to these changes is often dependent on the corporate governance rules. The study investigated how the changes in the IAF give it acceptance and legitimacy as an effective corporate governance tool. Institutional theory's relevance is in understanding the impact of internal and external influences on organisations that are engaged in IT-induced change (Weerakkody et al. 2009). Few have focused on using institutional theory to investigate the impact of IT-enabled change in IAF. Weerakkody et al. (2009) found that institutional theory has been used to study IS implementation across different contexts. The theory offers a good conceptual basis for studying transformational change in new environments.

According to Creswell (2009), who organises qualitative research approaches along a continuum on the basis of how theory is used in them, case studies are in the middle of the continuum. The case study used in this research relies on institutional theory to interpret the

findings. Theory has an essential role in the case study design and the data analysis (Perry 1998). The research used a multiple-case study to find whether the empirical evidence confirms the conceptual framework, which is built upon institutional theory, and whether the findings call for modifications to the framework (Oates 2006). This procedure does not mean simply imposing theory when analysing the data instead of generating original categories; it offers ideas and helps to produce a preliminary theoretical framework that should be considered as a "sensitising device" (Klein and Myers 1999, p. 75), which could be modified in accordance with the findings.

5.7.4 Use of NVivo

Following the pilot interviews that were carried out to test the interview agenda and to gain a feel for the important issues, the data were manually analysed and at the end of this process it was decided that it would be necessary to use a software package for the full study. The decision to use NVivo was initially made on the basis of huge volume of data. The possible alternative options were explored by attending two-day courses about the different packages before the decision was made to use NVivo. It was chosen mainly because it was new and it had therefore addressed some of the earlier problems of other packages. The time required to become familiar with the package was an important part of this decision. NVivo is user-friendly and relatively simple to use.

There has been discussion about the usefulness of using computer software in qualitative data analysis (Miles and Huberman 1994; Creswell 2009). Many qualitative researchers suggest the use of software such as NVivo to carry out a thorough, transparent and more reliable qualitative data analysis to add rigour to qualitative research (e.g. Myers 2009). Using a computerised database helps to manage large amounts of data (Baxter and Jack 2008). Using a database improved the reliability of the case study findings.

Flick (2009) identifies three main benefits for using computer software for analysing qualitative data. These benefits are speed, increase of research quality and improvement of data representation. Qualitative

data analysis software enables the researchers to handle, manage and search data in a shorter time in comparison with a manual process. It allows the researchers to be consistent in the analytical procedures which improve the validity of the research. Moreover, it enables the researchers to display the data in graphical format which facilitates better interpretation and discussion from different perspectives.

In this study, NVivo enabled independent inspection and enabled organising data sources for easy retrieval later on. It was used to provide bins into which data can be organised. This programme facilitated the recording of source detail, time and date of the data collection and provides storage and search capabilities. Documents were directly imported and coded easily on screen. It added to the analysis process transparency than would be the case using manual methods, and hence, data were interpreted more confidently. Additionally, NVivo facilitated writing memos about different aspects of documents and linking them to relevant pieces of text in different documents. NVivo was used to help analyse qualitative data through providing facilities such as: text search, easy coding, data organisation, writing tools, visual displays and exporting. NVivo does not do any analysis automatically, but it does help the researchers to find links between data. It was used mainly as an organising tool. It was used for administrative tasks of organising the data efficiently and was exploited to the full on this basis.

5.7.5 Criteria for Findings Trustworthiness

Some have tried to use the same criteria as for positivist research which include objectivity, reliability, internal validity and external validity (e.g. Yin 2009); however, they are not appropriate for interpretive research (Lincoln and Guba 1986; Díaz Andrade 2009). Thus, different criteria are needed for interpretive research (Morse et al. 2002). Unfortunately, there is not an agreed set of criteria for interpretive research. Guba and Lincoln (1994) propose a set of criteria for interpretive research which include trustworthiness (validity), confirmability (objectivity), dependability (reliability), credibility (internal validity) and transferability (external validity). Morse (1999) suggests that it is a "*myth*" to claim that validity is not

relevant criteria to qualitative research. Regardless of the naming debate, trustworthiness in the current study stems from establishing specific techniques and practice as explained in the following subsections:

5.7.5.1 Credibility

Credibility of qualitative research parallels validity in quantitative research. It means the extent of accuracy of results, matching reality and measuring it correctly (Guba and Lincoln 1994). To ensure the credibility of the research, a number of techniques were adopted.

All efforts were made to have a well-designed research that examines the right things and collect the right data from the right source, to increase creditability. Prior to the fieldwork, the interview questions were reviewed and checked by four academic and professional experts in the IAF and ERP systems field, two academics and the others were one from the internal audit profession and one ERP expert. Moreover, the research depended on qualitative data that is helpful for understanding relationships and the reasons underlying a relationship by offering an explanation of what happens. This is essential to the research validity (Eisenhardt 1989).

The researchers spent approximately three months in the work settings of the four organisations in order to become familiar with the people participating in the research and to be able to observe their everyday routines and any unusual events. This prolonged engagement allowed the researchers to develop an in-depth and comprehensive understanding (Morse et al. 2002) of the implications of ERP systems implementation for the IAF.

Some key verbatim quotations expressed by some participants are presented in supporting the arguments in each case report. Presenting some raw data collected from the fieldwork "allows the reader to get a better picture of the respondents' own concepts and categories, without relying solely on the interpretation of the researcher" (Lee and Lings 2008, p. 237).

As another way to increase credibility, this research takes into account the research participants' comments. Bryman and Bell (2007) suggest

that members' validation is a supportive tool to confirm the collected data before moving further in the project. This technique gave the ability to refine, clarify and expand the understanding of the collected data. In this research, this technique was applied after each interview through summarising the main points mentioned by the participant for final confirmation. Moreover, the initial draft of each case study report was e-mailed to some key participants in order to verify for accuracy and getting further feedback and clarification where necessary. As Yin (2009, p. 183) highlights that the review of the draft of the case study report "produces further evidence, as informants and participants may remember new materials that they had forgotten during the initial data collection period".

One more technique to increase the research credibility is the use of the triangulation as explained in Sect. 4.6.1. This allows the researchers to view a particular point in research from more than one perspective. Furthermore, credibility was verified through depending on a multiple-informants design for the semi-structured interviews. This allows viewing research points from more than one perspective (Morse et al. 2002).

To increase the credibility of the results, the research presents the theoretical reasons for the existing relationships. The research ensures that the subject of the inquiry is accurately identified and described. The researchers looked for any cause–effect relationship that can offer a reasonable explanation of the phenomenon under study. This added to the credibility of the analysis and findings (Guba and Lincoln 1994).

The peer debriefing process is to involve colleagues in the research as external reviewers (Lincoln and Guba 1986). In this research, data sharing with colleagues was another technique used by the researchers to gain alternative perspectives from others. Peer debriefing helps in broadening the interpretation of the data and in overcoming biased explanations by challenging the primary assumptions by a qualified peer.

5.7.5.2 Generalisability

Generalisation is "concerned with the application of research results to cases or situations beyond those examined in the study" (Collis and

Hussey 2009, p. 59). This could be a criticism which is directed to the statistical and not to the analytical generalisation that is the basis of case studies. Often it is suggested that case results cannot be statistically generalised (Yin 2009). No statistical support exists that enables the results to be projected outside the studied cases; however, case studies depend on an analytical generalisation (Yin 2009). Interpretive research does not seek statistical generalisation. Instead, it seeks a deeper understanding of the phenomenon, which can then be used later on to inform other settings (Orlikowski and Baroudi 1991). From an interpretive position, the validity of doing so relies on the plausibility of the logical reasoning used in describing the findings and in drawing a conclusion from them (Walsham 1993).

In this study, generalisation is not statistical but analytical in which an established theory is used as a model to compare the empirical results of the case study with it. Generalisation of the cases' results is important so that it contributes to the theory based on replication logic (Rowley 2002). This study uses replication logic by testing the results through a multiple-case study. In this study, the researchers adopted the replication logic to replicate the initial case, carrying out further investigation in an area suggested by the first study, or complementing the first study by focusing on an area not originally covered. This process is often referred to as analytical or theoretical generalisation (Yin 2009).

Four other types of generalisation from interpretive case studies are suggested by Walsham (1995a): the development of concepts, the generation of theory, the drawing of specific implications and the contribution of rich insight. This study offers a conceptual framework which is a theory presented via a diagrammatic model. In this research, the transferability can be seen as a basis for further research using the same theory or framework. This study offers some implications as suggestions about what might happen in other similar situations with some recommendations for action. The research included the temporal and spatial dimensions of the phenomenon in the analysis to facilitate theoretical generalisations (Walsham 1995b).

Although each case is unique in some aspects, it could still be an example of broader classes of things so that a degree of generalisation is still possible. Sufficiently detailed descriptions are provided so that a

judgement can be made on whether other situations have similar features so that the findings could be relevant there too (Lincoln and Guba 1994). This research develops thick descriptions for the cases and therefore facilitates matching them with other circumstances (Bryman and Bell 2007).

5.7.5.3 Confirmability

In positivist research, it means being free of researchers' bias (Lincoln and Guba 1994). However, interpretive researchers interact with participants; therefore, they probably have some influence on them. It is a problematic issue and a source of criticism in using the case study method because of potential researcher subjectivity. Therefore, it is important to reduce subjectivity by linking data collection questions to research questions (Rowley 2002).

Three solutions to counteract this have been proposed by Yin (2009) and used by the researchers: using various sources of data, establishing a string of evidence as discussed in Sect. 4.6 and having a draft of the case study report to be reviewed by key interviewees. Moreover, to achieve confirmability multiple-data sources, methods and informants checking the correctness of descriptions and interpretations have been used (Doolin 1996; Lincoln and Guba 1994). Furthermore, the research tells enough to judge whether the findings do flow from the data in the setting (Lincoln and Guba 1994). Presenting the chain of evidence contributes to the trustworthiness of the analysis. Through the trustworthiness procedures, the research offers a rigorous flow to enable auditors and any external inspection to track the development of the idea through a chain of evidence (Yin 2009).

5.7.5.4 Dependability

In positivist research, it means whether the study can be replicated with similar results (Lincoln and Guba 1994). It means to demonstrate that the research instruments are accurate and reliable (Oates 2006). This is achieved through documentation of procedures (Rowley 2002). The

research process is well recorded and the data documented. One of the most important methods used is the development of a case study protocol and developing a case study database (Yin 2009). From an interpretive view, the purpose in doing so is not to guarantee that a repetition of the research will draw exactly the same conclusion; the same data can be used and offer a dissimilar interpretation. Rather than presenting a completely different picture, it might discover a different angle to the phenomenon under study (Díaz 2009).

In this study, to enhance the dependability of the research: a case study protocol is used to ensure following standard process in all cases. Recorded data were transcribed in full to ensure as much accuracy as possible in terms of interpretation. A structured case study database is created to store empirical data from all the interviews and documents to ensure that the fieldwork data were collected and stored in a systematic and logically ordered manner. Complete records for the process of data collection and analysis are accessible and available in digital format for any further review.

5.8 Ethical Considerations

Ethical issues are critically important in social research in general and in qualitative research in particular (Tilley and Woodthorpe 2011; Myers 2009). Unlike other social researchers, the relationships between management researchers and participants are characterised by a power imbalance (Bell and Bryman 2007). Senior managers have the ability to wield power by defining access boundaries and setting expectations regarding the research output. However, the researchers were in a weaker bargaining position; he secured consent and used this power in the research favour by convincing the top managers with the importance of the research and the needed access to get findings that may benefit their companies. Companies asked the researchers to sign confidentiality agreements restricting what information can be disclosed about them.

Like other social researchers, management researchers face pressure to protect the confidentiality and anonymity of participants' and

companies' identity to avoid harmful effects (Tilley and Woodthorpe 2011; Bell and Bryman 2007). Confidentiality means the protection of information supplied by research participants from other parties, while anonymity involves the protection of the identity of an individual or company by concealing their names or other identifying information. Therefore, the researchers protected these identities by using pseudonyms and removing information leading to identification of the individuals or companies described in the study. All the participants were notified and assured that their inputs and feedback would be used only for research and it would be kept strictly confidential. This approach enabled the participants to be open and frank about sharing their personal beliefs and experiences.

As explained in detail in the case study protocol and interview agenda (see Appendix A and B), many procedures and practice worked as guidelines to the interview processes before, during and after the interview. For instance, as an introductory for each interview, participants were provided with information about the interview's general purpose and duration. To ensure the standardisation and clarity of the message delivered to all participants, the same statement was used to explain as fully as possible what the participants would be asked about, the aim of the research, who is undertaking it, the possible contributions and finally how and where its results would be disseminated.

Participants were informed that participation is not compulsory so they can refuse to continue whenever they want. This was stated in alliance with the code of ethics in the conduct of research with human participants, by "informing participants about the nature of the study, and respecting their freedom to decline to participate in or withdraw from the research in any time" (Krathwohl 1997, p. 212). Moreover, Payne and Payne (2004, p. 68) highlight that participants should "be enabled freely to give their informed consent to participate, and advised that they can terminate their involvement for any reason, at any time".

To ensure privacy and confidentiality, the participants were informed that the tape recording will be destroyed after they check and review their transcripts. Moreover, the researchers were aware of the ethical considerations during the analysis of the data obtained. This awareness can be seen in the obvious attempt to maintain the objectivity of the

research by considering all the generated data and not being selective during this stage.

In order to facilitate the access to the organisations, confidentiality approvals were sought and obtained from the university authority as a form of assurance to the organisations and individuals involved of absolute anonymity and confidentiality as well as judicious use and control of the data obtained. During the data collection process, an informed consent form (see appendix A) was handed to all participants and requested their signatures showing their participation to be voluntary.

In sum, it was important to maintain ethical standards of interviewing. These involve: obtaining ethics approval from the relevant ethics committee and permission from interviewees; treating interviewees with respect to their time, position and knowledge; keeping records and transcripts confidential and secure and providing feedback to subjects and organisations as recommended by Myers and Newman (2007).

5.9 Conclusion

This chapter has explained the research design and the methods used in the book. The researchers explicitly articulated the nature of the research problem and determined the ontological stance which led to the epistemological and methodological stances. The study is designed under an interpretive paradigm, which took the form of a multiple-case study and the analysis of a considerable amount of primary and secondary qualitative data. This enabled the researchers to interact closely with the participants and to explore issues in depth. Researchers should be aware that qualitative methodology is more applicable to develop an in-depth understanding of contextual-related problems. Qualitative design is more sensitive to context and flexible to embracing emerging new themes.

The richness of data produced through using multiple-case studies helped better to investigate the phenomenon of the IAF adaptation as a response to the ERP systems implementation. The use of case studies provided greater internal and external validity than other quantitative methods would have done. Triangulation of methods was achieved

through the use of semi-structured interviews, focus groups and non-participant observation. The qualitative content analysis was found to be the appropriate technique for analysing the data. A qualitative content analysis technique was deemed more desirable for this study as it preserves as much as possible the deep meaning of the qualitative data. Furthermore, it enabled the interpretation of all transcribed interviews, documents and notes of observation and relating each one to the whole in order to gain a holistic picture of the phenomenon. The trustworthiness strategies which were used in this research and the related procedures and techniques were found to be interlinked that fostered the coherence and validity of the research.

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6

Findings from Case Study 1—The International Company (IC)

6.1 Background and Overview

IC is an international company specialising in fast-moving consumer goods. It has a primary listing on the London Stock Exchange and secondary listings on the New York Stock Exchange. Its products include foods, beverages, cleaning agents and personal care products. IC has been selected because of a combination of accessibility and representativeness. IC introduced SAP as its ERP system in 2010 and included modules that cover financial accounting, controlling, sales and distribution, materials management and human resources. The goal was to consolidate different systems into a single informational model. Before SAP was implemented, it could take more than a month to obtain a consolidated view of financials.

Nine interviews with the stakeholders were conducted; all related documents were analysed along with a few observations as summarised in Table 6.1. In the following subsections, the findings related to each construct of the conceptual framework are presented and discussed.

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Table 6.1 IC interviewees and other sources of evidence

Interviewees
Chief internal auditor (CIA)
Senior internal auditor
Head of risk and control department
SAP financial module manager
SAP vendor
External auditor (one of the big 4)
Head of the IIA in Egypt
Head of the IT department
ERP implementation consultant
Sample of documents: training materials, newsletters, the code of business principles at the company, code of ethics at the company, compliance manual for the disclosure and transparency rules, the risk management policy, the accounting and reporting policy, IT operational control assessment, Egyptian corporate governance code, Corporate Law (159), Capital Market Authority Law (95), SAP ERP application guides, SOX 2002, International Standards for the Professional Practice of IA and IIA code of ethics
Sample of observations: relationship between the IAF and other departments, arrangement of the internal audit department, IAF's use of computers and automated tools, auditors' age group, availability of internal audit job descriptions and manuals, posters displayed in the internal audit department, IAF posters in other departments

6.2 IAF-Related Governance External Pressures

Internal changes in organisations are responses to external institutional pressures (DiMaggio and Powell 1991), and the IAF is subject to rules and regulations to which it must conform in order to ensure its legitimacy. The main concern here is about the rules, policies, codes and regulations that put pressure on the IAF to add value as a governance effective mechanism. As IC is an international company, these governance pressures are from the Egyptian and international institutions.

6.2.1 IAF-Related Coercive Pressures

These pressures arise through the legal environment and the existence of standards, which are imposed on organisations (DiMaggio and Powell 1991). In the context of the IAF, coercive pressures consist of these

exerted through mechanisms of authority and legitimisation to improve the IAF not only to check the adequacy of the internal control system but also to engage in a wider review of the efficiency and effectiveness of the activities and their effect on achieving goals.

In the Egyptian context, two laws regulate companies. These are the Corporate Law No. 159 issued 1981 that regulates shareholding joint stock, partnerships and limited liability companies and Capital Market Authority Law No. 95 issued 1992 which regulates listed companies on the Egyptian stock exchange. By thorough review and analysis, the researchers find that none of these laws state any article that necessitates organisations in Egypt to have an IAF.

As a response to the growing interest in governance, the Egyptian corporate governance code has been issued by the Ministry of Investment in 2005, and revised 2011, recognising the importance of the IAF and its extended role. By analysing this code, it has been found that companies have to maintain a sound internal control system that could be established by the board of directors and management (Sec 4.1). The board is responsible for setting up a strategy to identify risks and ways to manage them (Sec 3.25). This code highlights the importance of the IAF in assisting the board of directors to achieve these responsibilities. The code requires maintaining an independent IAF headed by full-time manager reports directly to the board and audit committee. With respect to the IAF activities, the code confirms that the IAF manager is responsible for setting up systems to evaluate the controls and the procedures of risk management and for maintaining soundly corporate governance process (Sec 4.2 to Sec 4.8).

In contrast with some developed countries, the Egyptian governance code is neither mandatory nor legally binding. This means that maintaining an IAF is still voluntary. There is not any compulsory rule or regulation that requires having an IAF. Even the listed companies on the Egyptian stock market are not required to have an IAF, as pointed out by more than one of the interviewees.

> The only compulsory governance regulations are issued by the Capital Market Authority asking all listed companies in the stock market to have an audit committee without mentioning anything about the IAF. There

> is not any compulsory law for other companies to have an audit committee or an IAF. Unfortunately, Egypt is not developed in this area, while for example the approach of the Government of Kenya to modernise this function was the formal legal recognition of the role of internal audit as part of an effective financial management system, changes in working methods enabled a revamped IAF to drive improvements in efficiency and controls. (Head of the IIA in Egypt)

IC has to comply with is SOX Act 2002 in the USA. According to SOX, the CEO and CFO are responsible for certifying the "*appropriateness of the financial statements and disclosures*" (Sec 302) and the management are responsible for maintaining an adequate internal control system (Sec 404). The researchers found these two points are mainly relevant in relation to activities of the IAF: the strong relevance given to the reliability of financial information and the assertion of management's responsibility for the internal control system. Moreover, it is required by SOX that external auditors test the internal control system and determine the test sample size and period needed for audit based on the control system testing results of the IAF.

At IC, compliance with governance structure is facilitated through the internal policy framework, which is mandatory to ensure consistency and that applicable laws and regulations are being complied with. As confirmed by IC's *Code of Business Principles* (2012): "In accordance with the requirements of Section 404 of the US Sarbanes-Oxley Act of 2002, the management is responsible for establishing and maintaining adequate internal control over financial reporting… IC will conduct its operations in accordance with internationally accepted principles of good corporate governance".

There was a belief at IC that ERP systems could enhance imposing governance pressures. ERP systems implementation exerts pressure when it takes into consideration and embeds into its best practice the governance rules and internal policies. An ERP system was considered as a tool that transfers governance rules and regulations to the business process and consequently affects the IAF. The interviews confirmed this effect on the IAF.

> In IC, when ERP system becomes aligned with the governance rules it enforces individuals to change their habits. They might do compliance

> without knowing. They are following the way to process through the application regardless the rules behind. (External auditor)

It has been found that institutional pressures have an important role, especially when regulations impose sanctions, in directing the IAF, as was confirmed by interviewees such as the head of the IIA.

> There should be compulsory laws and regulations to enforce companies to maintain a good IAF. These laws should govern the internal audit profession and have the enough power to direct this profession into the right path. This is what profession misses. (Head of the IIA in Egypt)

This analysis shows that the coercive pressure related to the IAF is very weak in Egypt. Egyptian regulations do not make any detailed prescriptions for the IAF. Even the international rules and regulations, which IC is subject to, require a sound IAF to be maintained without determining any details. The only thing which international regulations clearly state is that the IAF should play an effective role in assuring internal control and risk management to be legitimate.

6.2.2 IAF-Related Normative Pressures

Institutional normative pressures are transmitted through inter-organisational networks, professional standards and education (DiMaggio and Powell 1991). In the case of the IAF, pressures come from an increase in professionalisation within organisations in terms of studying internal auditing in universities, qualifying as a certified internal auditor and the existence of the IIA chapter in Egypt. This professional training is likely to increase the profile of the IAF. In addition, the increase in professionalisation is likely to produce a greater adherence to IIA standards.

In Egypt, internal auditing has not been fully recognised as a specialised profession. Although there is the IIA as a professional body to govern this profession, it has a minor role as its *Standards for the Professional Practice of Internal Audit* are not mandatory. The common perception of the IAF in Egypt is that it is merely a kind of financial auditing that checks the correctness of the accounting figures. There is a lack of

proper awareness and understanding about the IIA standards and most of the interviewees confirmed this:

> The common theme in Egypt about the IAF is that it is considered as an inspection function its main role to find errors and fraud…The internal auditors' knowledge about the internal audit standards is very poor… There isn't any professional enforcement to implement the IIA standards. Recently, the IIA tries to spread the CIA certificate that gives the internal auditors full awareness of the IIA standards and asks them to implement these standards… The number of the internal auditors who get the CIA is increasing every year. There are IIA standards for whoever needs it but without any tool to force implementing them. All these efforts are not guarantee of the IAF effectiveness unless there are compulsory regulations. (Head of the IIA in Egypt)

Furthermore, there is no Egyptian professional institution to support the IAF by issuing internal auditing standards. Therefore, there is no separate code applicable to the IAF in Egypt. These characteristics of the internal audit environment in Egypt mean that internal audit practice may significantly vary among organisations.

IC applies the *International Standards for the Professional Practice of Internal Auditing 2000*. Therefore, there are normative pressures that promote the ultimate goal of the IAF to add value through having an effective role in governance: "The internal audit activity adds value to the organisation (and its stakeholders) when it provides objective and relevant assurance and contributes to the effectiveness and efficiency of governance, risk management and control processes" (Standard 2000, p. 5).

IC applies the *IIA's code of ethics* and *Standard 1210 A2* to encourage internal auditors to gain whatever suitable knowledge and skills that give them the ability to perform their professional tasks to a high standard. In particular, *Standard 2110 A2* encourages internal auditors to be involved in the ERP systems implementation as it is essential for internal auditors to evaluate risk exposures related to ISs: "Internal auditors must possess the knowledge, skills and other competencies needed to perform their individual responsibilities. The internal audit activity

collectively must possess or obtain the knowledge, skills and other competencies needed to perform its responsibilities…the IAF must evaluate risk exposures relating to the organisation's governance, operations and information systems" (Standard 2110 A2, p. 6).

Furthermore, the IAF at IC is asked by Standards (2310, 1220 A2) to use the appropriate technological tools and techniques to improve the auditing information quality. In addition, according to Standard 1210. A3, "Internal auditors must have sufficient knowledge of key IT risks and controls and available technology-based audit techniques to perform their assigned work". The standard refers to the structure of the internal audit team by adding: "However, not all internal auditors are expected to have the expertise of an internal auditor whose primary responsibility is IT auditing" (Standard 1210.A3).

At IC, the professional networks supported the normative pressures to comply with the standards. The IAF had to comply with a list of internal policies that were mainly based on the international standards and regulations. These standards and regulations promoted increased acknowledgement of the IAF as one of the cornerstones of the corporate governance process. In support of this role, it has been observed that in the internal audit department some posters are displayed containing quotes from these standards and emphasising the importance of applying them. Moreover, interviews confirmed that:

> IC is governed by the international internal audit standards of the IIA and internal policies that govern in details the IAF and its role in the risk and control in a fully compatible way with the international guidance of the IIA. (Chief Internal Auditor)

> We are subject to many revisions from corporate audit teams of the head office in London. They review compliance with the list of policies. The important professional support for the IAF is the professional global network within IC. (Senior internal auditor)

From the analysis, it has been found that at IC all normative pressures legitimise the modern IAF that plays an apparent role in the internal control assurance and risk management. The internal audit at IC is

risk-based auditing as its scope was influenced by threats that should be reduced and these threats were documented in the audit plan and confirmed by interviewees.

> In the beginning of each year, the corporate risk management team puts the directions that help in the scope of the IAF. Based upon many variables the plan determines the areas to be in scope for each year. (Senior internal auditor)

Normative pressures at IC determined the most important activities for the IAF which gives it legitimacy. Normative pressures were supported from the head office abroad by the requirement that the internal policies of IC should be binding for IC Egypt. The IAF's activities, skills, tools, knowledge base and structure were determined by normative pressures. These normative pressures had a positive impact on guiding the IAF adaptation after ERP systems introduction.

6.2.3 IAF-Related Mimetic Pressure

These pressures appear in a context of uncertainty, when organisations or sub-organisational entities try to change themselves into other models perceived as more legitimate (DiMaggio and Powell 1991). At IC, mimetic pressure took place when internal auditors perceived that adapting the IAF after ERP implementation would maintain their legitimacy. ERP systems introduction creates uncertainty in the working environment of internal auditors. Therefore, internal auditors tried to copy a successful model and adopted standard responses.

At IC, although all the internal audit team are from the Egyptian local working environment, once they joined the international working environment they were affected by it. They tried to copy the behaviour of the internal audit team of the head office and of other IC subsidiaries outside Egypt. Therefore, after ERP implementation the Egyptian IAF copied the IAF model from other IC subsidiaries outside Egypt in its activities and structure, so as to improve legitimacy. This copying of the IAF model was evidenced through observing the extensive communications, in terms of e-mails and calls regarding this issue, between the

internal auditors at IC Egypt and other auditors from IC professional group outside Egypt. It was also confirmed in the interviews such as by the CIA who said:

> Before implementing SAP, there were uncertainty about the internal audit practice and structure. Therefore, we start looking at IC in the same region who implement SAP before. We were lucky as we have a successful example of how internal auditing is done after SAP and how should the internal audit team be. (Chief internal auditor)

The mimetic process was facilitated by having an international auditing professional network. This network gave the IAF in IC an idea of how to adapt based on the previous experience of other ICs outside the Egyptian audit professional environment.

6.3 Control Assumptions of the ERP System

ERP systems are subject to institutional pressures of the rules of governance and control. They are embodiments of their institutional logic and preserve these rules by constraining individuals' actions into particular modes of interaction that may not be preferred by them. While ERP systems can be customised to suit different business processes, vendors argue that embedded best practice improves the efficiency of existing business processes. Accordingly, organisations face pressures to conform to this practice. By examining the contents of the institutional logic embodied in ERP systems, it became possible to understand and explain the nature and types of social relations that exist between organisations and individuals (Friedland and Alford 1991).

Control is the principle commonly associated with the particular rationalised logic and procedural focus of ERP systems (Yoo et al. 2007), which affects the IAF. This was confirmed by the head of the IIA in Egypt and many others.

> Definitely, the internal control environment after ERP systems implementation has been changed than before. As the IAF is a part of the control system it should change as well. ERP systems implementation affects

> the IAF in an indirect way through bringing new ways to control; however the impact of ERP systems implementation depends on understanding ERP systems control logic. (Head of the IIA in Egypt)

> One of the major motivations of implementing ERP systems is to increases profitability through improving the internal control systems … SAP gives high control. (SAP Financial module manager)

Conceptions of control can be understood as an institutional logic. However, while institutional logics present the "cognitive maps" of activities, conceptions of control are akin to managerial practice (Rajao and Hayes 2009). As an institutional logic is founded on assumptions associated with specific causal means—end relationships (Bacharach et al. 1996), the researchers explored the ERP systems' assumptions of the logic of controlling the business in depth and the impact on the IAF.

6.3.1 Automation

ERP systems control is based on automatic checking of the validity of a process in order to maintain the process. At IC, ERP systems have enabled internal auditors to automatically monitor internal controls, which was not possible before. For example, ERP systems provided control reports to highlight inappropriate segregation of duties from an organisation-wide perspective. Moreover, ERP systems controlled the segregation of duties conflicts by providing automatic tests that can be regularly run.

> Instead of using separated systems with manual controls there was a need for implementing ERP systems that enable more systematic automated controls on the business process and its financial impacts. Controls in ERP systems are based on automated validation process that is running on all different levels … . ERP systems provide automatic control on users and duties assigned… These points have affected the IAF efficiency at IC. (SAP vendor)

Additional evidence has been found in SAP control framework documents, as the SAP system has an automation controller that administers all instances of custom controls for desktop applications. The

automation controller contains a list of the events that a custom control can trigger. Communication between controls at the frontend and the application programme at the backend runs through the automation controller. The objects control framework has a similar function at the backend to that of the automation controller at the frontend.

Therefore, ERP systems offered internal auditors at IC continuous monitoring and assurance that security and validation processes run automatically and prevent any unauthorised action or any unapproved process. The ERP provided automated audit tools such as discrepancy reports and reconciliations. The ERP automatically generated an audit trail, which gave auditors the ability to trace and verify all entries. This encouraged the internal auditors at IC to automate some of their tasks, and evidence was found for this when the external auditor stated:

> ERP system gives the internal auditors at IC the possibility to perform many tasks automatically without moving from their offices. They follow up and review the process continuously from their own computers. They can run many automated tests to check controls with one click. (External auditor)

6.3.2 Continuous Timely Monitoring

ERP systems enhanced real-time data processing and facilitated real-time control. ERP systems offered real-time updating and integrating for enterprise information flow with logistics and real-time sharing and multi-path query for internal control support. ERP systems provided, the IAF at IC, with many options for continuous monitoring such as periodic monitoring, ad hoc monitoring, specialised reports, red alerts when there is an inappropriate usage on the system and exception reports. These reports helped internal auditors monitor and improve user access controls and segregation of duties on continuous basis. This continual monitoring and improvement of internal controls gave internal auditors assurance about compliance with relevant policies. Most of interviews stressed this point, for example:

> ERP systems guarantee timely accurate information. The business process followed by all employees is reviewed directly and continuously by the

> system. Thus it is very easy for internal auditors to detect any divergence at its time of occurrence. (SAP vendor)

ERP systems implementation provided the infrastructure necessary for the effective evolution of the IAF to be an ongoing process. ERP systems gave the opportunity to add continuous auditing software.

6.3.3 Data Consistency

In order to have a good internal control system, internal auditors needed to have consistent data from different sources. The study found that ERP systems enhanced the internal control system through providing data regarding each business unit in the same format. The new possibility provided by ERP systems, which attracted the internal auditors' attention, was quick and easy data consistency. Before implementing ERP systems, different members of the same department had different data input formats resulting in data manipulation opportunities. There were different values for the same business data in different departments at IC. Before ERP system implementation, data were not consistent and could not be consolidated easily. ERP systems offered data consistency when consolidated from different branches of IC. This issue of data consistency was discussed by several of the interviewees.

> Before implementing ERP systems we had a challenge that each region has its own system and its own sets of data so that we couldn't guarantee the quick consistency of the data when consolidating it. The use of ERP systems significantly strengthened our capabilities by providing timely, consistence and accurate financial and non-financial information that enable us to make better assurance. SAP generates consistency between financial and non-financial information in business cycle from beginning to end. (Chief internal auditor)

ERP systems stored all the relevant information arising from the occurrence of enterprise-wide business activities whether financial or non-financial, so offering consistency of data and eliminating data

duplication and redundancy. Therefore, ERP systems are considered by internal auditors at IC as enabling control systems.

6.3.4 Control Through Integration

Having many legacy fragmented systems challenged the control improvement at IC. Integration through using one system with one database was among the main motives for ERP systems implementation at IC. ERP systems integrated business information, including financial and non-financial offering information integration with logistics. It is no longer needed to make multiple updates for the same piece of information in different systems. This reduced the likelihood of retaining and using inaccurate information by auditors. Integration facilitated data retrieval, updating and accuracy. Moreover, the automated integration of activities made individuals' actions visible as data entered in one place automatically flow through to others. The SAP financial module manager asserts that:

> ERP system generates integrated working environment to preserve consistency of data. ERP systems integrate most of corporate information in one database. Integration reduces the need to do manual reconciliations of data drawn from different sources; therefore enchase internal control assurance. ERP systems allow internal auditors to retrieve information from many different organisational positions and provide them the visibility to any organisational object. (SAP financial module manager)

> The integration provided by ERP systems enhances the IAF effectiveness. ERP systems bring all operational information …into one database, integrate it with financial information and make it available for the auditing department. This shows the importance of ERP system in internal auditing field. (Senior internal auditor)

ERP systems provided a more integrative internal control system rather than isolated internal controls to improve operational and financial controls. Therefore, internal auditors were aware that internal control compliance, if not monitored properly, can result in significant losses.

6.3.5 Multiple Methods of Control

After ERP systems implementation, the control system at IC was based on multiple methods of control for the same object. ERP systems discriminate between the movement of materials, goods and their financial impacts and offer controls in different ways such as controls of logistics, controls of financial results and controls by matching and keeping consistency. ERP systems shifted auditors' attention towards new non-financial controls besides the traditional accounting-based control reports.

> ERP system has not a separate module for internal audit; however ERP systems are based on multiple controls. Just when ERP system is implemented internal auditors get the assurance that: validation process is running on all different levels, security profiles are set up for each user … ERP system provides Multiple Methods of control the same transaction. (SAP vendor)

The study finds that after ERP implementation, the focus of internal controls becomes wider than concentrating only on accounting processes and figures to focus on the whole business processes and compensating controls. ERP systems help internal auditors assure dependable financial and operational controls. ERP systems support audit requirements through providing: inherent controls which are delivered with SAPERP and do not need to be designed into the system; configurable controls which are automated controls to be defined at the time of system customisation; security controls which have user access and segregation of duties controls and reporting controls that rely on standard or ad hoc reports.

6.3.6 Preventive Controls

The design of ERP controls is based on the segregation of duties auditing rule. The access protection system serves as a preventive internal control to prevent violations of any restrictions. It also ensures that no violations of accounting principles occur. Each user has an authorisation

profile that defines which specific records that particular user can access, change or delete. The study finds that internal auditors believe that data errors and irregularities are significantly reduced by limiting the responsibility that various employees have in the process. This has been confirmed by most of the interviewees, such as the financial module manager, who stated that:

> ERP system offers preventive procedures that enrich the IAF. Now we have in place preventive and corrective controls. Some checks had to be done by internal auditors on sample bases but now the system does it exclusively. (SAP financial module manager)

> The nature of our practise has changed. For example, before implementing the SAP we had to assure that every transaction has been approved, reviewed and signed. After implementing ERP system we do not do this. There is already full segregation of duties within the system. … ERP systems decrease the needed key controls and monitoring controls. … This saves our time and effort. Our duties moved from checking as a control tool to be monitoring and assuring that controls are working properly (Chief internal auditor).

More evidence found about the preventive assumption at the *SAP control framework* that when an event is triggered, the SAP automation controller checks whether the event is registered in its events table. If the event is not registered, it is ignored. If it is registered, the automation controller generates an OK_CODE; then, it passes to the objects control framework. Internal auditors at MI believe that ERP systems helped them in ensuring the integrity of data used for financial reporting through control access management to prevent misuse of data.

6.3.7 Standardisation

ERP systems embed standard business processes, standard general ledger and standard accounting structure that facilitate assuring good control procedures in IC. One standard work procedure is followed by all; thus, it is easy to detect divergences. At IC, by implementing ERP systems,

illegal procedures have been stopped, reengineered and standardised as they could not be customised in the systems. Tax affairs in Egypt can be easily manipulated to give suppliers and retailers illegal tax benefits through conducting transactions without formal invoices. Most interviewees asserted the importance of standardisation in enhancing the control system and data consistency. Interviewees such as the manager of the financial module emphasised this point:

> The challenge we faced when we took the decision to implement the SAP that we had different systems and we had to reengineer the processes to be standard in order to be in an auditable format. Our processes were very flexible and tailored upon our needs that led to the complexity of the process, especially in dealing with the traders… We gave them certain tax treatments as an incentive. Therefore, we had to re-engineer the process to be standardised within the SAP… After implementing SAP system, on the operational level, transactions are directly classified according to the standard chart of accounts. Therefore, it is easier for internal auditors to follow up on one unified and predefined way of doing business process. (SAP financial module manager)

ERP systems provided reports to internal auditors to assure that there is no deviation and the standardisation which is governed by ERP systems inhibited illegal actions.

6.3.8 Transparency

An ERP system provides a crystal clear business cycle that is important to support the internal control environment. A clear integrated business cycle means that there is only one way to do the process that will never change and there is no other way. The transparency and visibility offered by ERP systems is one of the most important control assumptions to assure a better governance environment. The study finds that the automated integration of activities makes individuals' actions visible for internal auditors as data entered in one place flow automatically through to others. Evidence about this transparency has been found through interviews; the ERP vendor stated that:

> ERP systems are considered as a means of changing the governance process through more transparency. ERP system offers more transparency for better internal control environment and wider view. Consequently, nothing can be hidden from auditors. It is impossible that any employee can manipulate on the system as any data change will affect other departments and can be seen by others. (SAP vendor)

The study finds that ERP systems enhanced the ability of the IAF to get the required data directly from the system. Therefore, nobody can hide or manipulate the figures that internal auditors review. ERP systems allowed auditors to retrieve data from many different organisational positions and provided them with visibility of any organisational object. Auditors believe that ERP systems integration made the information manipulation more challenging. The transparency provided allowed internal auditors to monitor any changes in the accounting records. The CIA confirmed that there was an improvement in transparency by saying:

> ERP implementation decision was based on the need and importance of more control and transparency of the financial results…When the processes become transparent enough, we as internal auditors start giving advices…ERP system provides the IAF transparency over the whole transactions. Any data entry or change occurred on the system can be traced easily to know who and when this happened. Internal auditors can know the owner of a piece of data, how and why an action has been done. (Chief internal auditor)

6.3.9 Compensating Controls

The presence of compensating controls means that there should be more than one control to serve the same area. The compensating controls "serve to accomplish the objective of another control that did not function properly" (SEC 2007, footnote 49). The study finds that ERP systems do not dictate one control for one risk but instead offer a mix between different controls to mitigate the same risk. In assessing internal control deficiency, SEC guidance and the PCAOB in the USA

indicate that auditors should consider the effect of any compensating controls (PCAOB 2007, para.68; SEC 2007). According to most of the interviewees, ERP systems offer these compensating controls that auditors should review.

> A more important point than focus only on the functionality of a list of controls is the compensating controls which are offered by SAP. By the time new instances may happen in the business which may affect the functionality of some controls in a specific area. What if these controls gone or get reduced then the risk exposure will increase. We should be ready by another control in place to serve this purpose. We should already have controls which serve a certain risk area but at the same time they can serve another area. These are called compensating controls. (Chief internal auditor)

The IAF is responsible for assuring the functionality and effectiveness of internal controls. These were changed after implementing ERP systems to be integrated, automated, standardised and multidimensional. The ERP system imposed pressures on the IAF through changing the way it carries out its responsibilities. ERP systems have the logic of cross-functional processes which differ from functional-based processes that auditors are used to. Internal auditors were not familiar with those new control assumptions; therefore, they faced pressures to change their professional knowledge base and the way they carry out their function. Some efforts at realignment had to take place to reduce the mismatch between ERP systems requirements, governance requirements and the IAF.

6.4 Aligning Efforts

The best practice embedded in ERP systems takes into consideration most of the governance requirements. ERP systems guarantee that standard processing is carried out according to internal policies and external rules. Therefore, the study finds that IC considered ERP systems as part of governance improvement efforts that focus on increasing

transparency, accountability and clarifying the segregation of duties between management oversight and business execution. Most of the participants have confirmed that ERP systems have compatible objectives with the ultimate goal of governance; for example, the financial module manager said:

> The top-down approach of ERP systems is linked with corporate governance and works well in our company… Efforts have been made to ensure the alignment among ERP systems, internal audits and governance to meet the requirement of regulations and to make the process auditable. (SAP financial module manager)

> ERP systems and governance rules are complementary in their impact on the IAF. Governance rules and ERP system are two sides of the same coin. Governance rules draw the process guidelines, while ERP systems execute work process taking into consideration these rules. ERP systems improved internal controls. As a result, there is evidence of greater accountability and governance within our company. ERP systems must be aligned, during the implementation process, with the corporate governance rules and regulations. … To be honest there were a lot of misalignments between the ways we were controlling the processes and way of the ERP processes. But since the new systems offer better options our internal audit team change the way of doing things. (Chief internal auditor)

> ERP systems are considered as means of changing the corporate governance process through more transparency, better internal control environment, minimisation of risks and change the IAF to be main effective actor in the governance process. ERP systems are highly recommended as a proof of having good corporate governance. (SAP vendor)

During the ERP system implementation stage at IC, the improvement of the internal control and the IAF along with enhancing governance were taken into consideration. The ultimate goal of the IAF as a governance tool is compatible with the way that ERP systems function in controlling the business process. According to the jobs description documents at IC, the IAF aims to improve the effectiveness and efficiencies of operations; to provide highly reliable financial reports; and to comply

with relevant laws and regulations. Therefore, ERP implementation provided a good opportunity for the improvement of the IAF. The CIA confirmed that:

> The IAF in our company is a main factor in the internal control structure, therefore considerable efforts made regarding: how to use ERP systems in assuring the effectiveness of the internal controls and in conducting audits?; how do ERPs enhance assuring the effectiveness of the internal controls and conducting audits?; How do ERPs support producing efficient internal audit data?. (Chief internal auditor)

Generally, ERP systems are aligned with the rules that govern the business; however, there were some misalignments. ERP systems implementation was a socio-technical challenge at IC that required different viewpoints from technologically driven innovation. Therefore, the alignment was an important issue related to the implementation at IC. In order to overcome the misalignment problems and utilise the internal control logic of ERP systems, the study finds that some efforts took place such as change management, process reengineering, customisation and involving internal auditors.

6.4.1 Change Management

Appropriate change management was the main effort to overcome misalignment risks at IC. ERP systems implementation was accompanied by changes in the way of doing business processes and consequently different ways of auditing them. Having a dedicated change management team was very important to deal with the fear and rejection of change at IC. IC planned well for ERP implementation involved internal auditors in the change management team; therefore, the IAF change was a part of the change management process.

Implementing ERP systems was accompanied by change management on different levels, where the successful restructuring and changing of operations was an integral part. Employees' disruption of restructuring programmes could lead to a delay in realising control

improvements. To mitigate these risks, there was a need for strong project management that included internal auditors, clear governance mechanisms and an agreed approach to change management to ensure that internal controls were in accordance with all requirements. This was confirmed by interviewees.

> IC has a global agreement with two consultancy agencies to support the SAP implementation and the required change management. We have to acknowledge that a huge change management took place across the business. Whatever the level is at senior, junior, team leader, audit or finance, there was fear and rejection at the beginning. We can say first two months. We had a dedicated change management team that include internal auditors to handle this problem. (Senior internal auditor)

Participants asserted that training was an essential component of the change management plan at IC. To gain the controlling benefits of ERP systems, all users were well trained and satisfied that the systems worked as they should. If the ERP system is misused, they become useless to the IAF.

6.4.2 Reengineering and Customisation

As these ERP systems were being implemented in one of the developing countries, there was a need to reengineer some business processes in order to be compatible with the standard process embedded in ERP systems. Reengineering was needed in the material and sales management processes and their financial impacts in order to be in an auditable format. Reengineering processes influenced job contents, responsibilities and behaviour of employees. Therefore, internal auditors were involved in the reengineering process in order to know how the standard financial data process is going to be and give feedback upon the acceptability of the modifications.

The study found that by implementing ERP systems, illegal procedures had to be reengineered as they could not be customised within ERP systems. In most cases, ERP systems offered a better way of

controlling business; therefore, internal auditors accepted the new practice and changes in the process. The CIA stated that:

> When ERP systems offered better way of controlling the process, we had to change our business process and accordingly sometimes we changed the policies that govern the business process. (Chief internal auditor)

> The IAF wasn't responsible for taking the SAP and adopting it to the current business process existed at that time. Instead, how to redesign the business cycle to be more aligned to the other branches in other countries who implemented the ERP system before. (Senior internal auditor)

ERP systems were customised or localised to comply with the Egyptian business environment, especially in the taxation process and controls. Most of the customisation that internal auditors ask for was related to the reporting area. Although ERP systems provide some standard reports, data volume, report format and data classification in some cases were unsuitable for internal auditors' use. Reports were insufficient to support the requirements either in presentation or in information content. Most of the customisation required the reproduction of existing reports or the creation of new reports for resolving control problems. Evidence has been found for these problems with reports in the interviews; for example, the financial module manager confirmed that:

> We had to do some customisation in the SAP systems. There are some features in the ERP system was not designed especially for the audit use but it can be customised to be used by the IAF such as reports and notifications. (SAP financial module manager)

6.4.3 Internal Auditors' Involvement

The logic of internal auditing had an impact on the business process and can change the way of doing things, for the reason that a process must be made auditable before an internal audit can be conducted. ERP systems have large numbers of controls which needed to be verified before going live. Internal auditors faced challenges in aligning

segregation of duties rules within ERP systems with the nature of the business process. The authorisations applied within the systems had to be aligned with the rules that govern the business. The main input of the internal auditors in the ERP system implementation process was related to the roles and authorisations within the ERP system.

The auditors' role during the implementation was to ensure a fit control environment which is preventive rather than detective and to capture ERP systems features. Internal auditors ensured that all control requirements were there in the system. During ERP systems implementation, internal auditors determined their specific reporting requirements. They focused more on some special security reports about the systems' users, users' assignments on different applications, working relationships among users in different departments and justifications for access given to each user in each area. Some of these reports were in the standard package; however, internal auditors asked for a wider view.

Involving the internal audit team in ERP systems implementation prevented IC from having internal control problems after implementation. The importance of the internal auditors' involvement in the implementation process has been confirmed through the interviews. Many participants consider that ERP systems without the involvement of internal auditors in the implementation cannot yield the targeted governance and control improvements.

> Some of the internal auditors were involved from the early stages and they had a great input in the implementation process. For example, they suggested having a standard chart of accounts on the regional level. … Therefore, the ERP system alone cannot enhance the corporate governance process. (SAP financial module manager)

The most important stage for involving internal auditors during ERP systems implementation was in gathering and mapping requirements. This was to take into considerations all the IAF requirements during all the other stages of the project. Internal audit team involvement in the ERP system implementation gave them significant awareness about the controls within the ERP system and how the business process goes through these systems. The senior internal auditor stated that:

> We were building the ERP system that we, as internal audit department, will depend on it later. … Although the internal audit team added to the implementation process of the ERP system, this process added a lot to our knowledge. The involvement in the implementation process step by step during the first phase and the intensive care period added to the internal audit team knowledge. Most of the focus of the IAF was on Rules and Authorisations, the access rights, the segregation of duties rules and the risk framework. (Senior internal auditor)

> The IAF role was assuring the harmony among the corporate governance, policies, the ERP system and the business process. (Chief internal auditor)

Corporate governance rules and ERP systems were considered at IC as two sides of the same coin. Governance rules draw the process guidelines, while ERP systems execute work processes taking into consideration these rules. In most cases, the ERP system offers a better way of controlling business; therefore, internal auditors accept the new practice.

6.5 IAF Adaptation

The IAF faced challenges of increasing complexity of systems and expansion of rules compliance requirements. The study finds that at IC, the internal auditors have exploited the implementation of ERP systems by transforming their functions and extending their areas of involvement. However, this change also requires redesigning of internal audit processes, competencies, roles, practice and structure. In the following sections, the internal audit adaptations are discussed in detail.

6.5.1 Scope of Services and Practice

After ERP systems implementation at IC, the IAF has received more responsibilities in relation to IT. For example, the IAF was assigned the responsibility of assuring that there is no financial data loss when

transferring to or from the ERP system, assuring the information security, assuring internal control procedures to prevent any unexpected failure of the systems, assuring the automated internal control system, assuring the segregation of duties, assuring access rights and assessing IT operational control.

The IAF was pressurised to become involved in more technical issues and business process details. For example, the IAF became responsible for assuring the existence of controls to prevent any financial data loss when transferring to or from ERP system, to check the relevant user authorisations and to prevent any unexpected failure of systems. Therefore, internal auditors had to understand and review the technical controls which are set up by the IT team. This wider scope has been evidenced by job descriptions and interviewees such as the manager of the financial module, who stated:

> We have to audit all types of controls in place whether they are in the systems or outside the systems to assure that there is not any loss of financial data, unexpected failure and to assure that they are able to mitigate risks. The IAF has a new responsibility to know, understand and review all types of controls to make sure that everything can be transferred correctly from SAP or into SAP. (SAP financial module manager)

> After ERP system implementation, the information security in relation to risk management and IT has been added to my responsibilities. The internal audit team is giving a wide focus on the segregation of duties and the access rights controls. (Internal auditor)

Because of the overall integration, all the business processes became included in the IAF scope. Internal auditors reviewed the frontend data mapping for analysing information integration. The integrated business process cannot be separated into an automated part and non-automated part when evaluating controls from end to end. Therefore, evaluating technology-related areas cannot be abdicated to IT auditors alone. As confirmed by participants as follows.

> If the IAF has properly adapted with the ERP system implementation as in the case of IC, its scope of services becomes wider to cover

> whole business. Furthermore, there is increasing pressure on auditors to undertake more audits and of a more complex character, than before…. Moreover, after implementing the ERP system the IAF is responsible for all the modules rather than the financial module only. The IAF covers some areas of the business haven't been in the internal audit scope before. Now there is an auditor specialised in sales, HR, manufacturing, purchasing and inventory. ERP system helps the internal audit to assess and make appropriate recommendations for improving the governance process. (Head of the IIA in Egypt)

Internal auditors were allocated a wider role in serving management not only from a financial accounting perspective, but also from an operations point of view. Internal auditors became internal management consultants, examining not only financial accounting figures but also non-accounting functions such as HR and sales. The ERP system supported the IAF by providing detailed data about each process and transaction from various angles. This gave the internal auditors a wider view of the business processes and helped them to do in-depth analysis and to take the initiative for giving consultancy advice. The scope of the IAF has been expanded from only evaluating the effectiveness of internal controls to providing management consultation services on various issues regarding performance developments. These findings are based on audit reports, and the interviews confirm them. The external auditor stated:

> In the ERP working environment, the IAF became analytical and creative. Internal auditors enter new areas to add more value. Internal auditors now focus more on offering consultancy to improve managerial decisions that have an impact on risk and control. (The external auditor)

The ERP system saves internal auditors' time and effort by decreasing the traditional workload and making it easier. The ERP system makes internal auditing easier by offering multi-integrated controls; transparency to trace; and ability to establish accountability systems. Some controls have been tested by internal auditors on sample bases but now the systems do it exclusively. The transactions audit was reduced, while the

significance of some practice has increased such as understanding business processes though the ERP system. Internal auditors at IC utilised the consistency of records of transactions and audit trail transparency offered by the ERP system to track every transaction to the general ledgers and sub-ledgers. The IAF changed from doing routine checking work to creative and analytical internal control review. Internal auditors adapted their methods, focusing on more value-added practice. The ERP system makes the internal audit an interesting function by elevating routine tasks that can be carried out by anyone.

> Although, the internal controls embedded within the systems decrease the internal audit traditional effort, the nature of the IAF has changed…It is responsible to assure that controls are in place, up and running. Internal auditors are now performing different types of services and different nature of work. Some controls would be done by internal auditors on sample bases, now the system is doing it exclusively. This frees the internal audit team's time to offer new types of services. IAF now offer consultancy about improving the work process. (SAP financial module manager)

The interviews yielded common themes that reflect the changing role of the IAF. The IAF turned from being an internal control in itself to monitoring the functionality and effectiveness of internal controls to mitigate risks. Moreover, there is a change in the focus from only assuring the functionality of a list of controls to assuring the existence of compensating controls. Therefore, auditors have to understand and test the internal controls applied within the ERP system. The nature of the controls through which the IAF gives assurance has changed as there are now preventive and corrective controls. The internal audit scope is based on risk assessment. Therefore, internal auditors assess risks around the ERP system as a subset of the overall internal audit risk assessment process and as an integrated part of the internal audit practice.

> In order to be able to add value after SAP implementation, we changed our way of internal auditing to ensure that controls are in place on a regular basis. The ERP system implementation helps the IAF to fully leverage the power of a single integrated IT system to improve operational control

> execution and drive controlling efficiencies. Our duties moved from checking as a control tool to be monitoring and assuring that controls are working properly. (Chief internal auditor)

The ultimate adaptation of the internal audit practice is that it becomes a comprehensive audit in which application general controls are covered seamlessly during end-to-end audits of the related business areas to mitigate related risks. The IAF ensures that all controls are addressed in an integrated fashion to mitigate risks. This is an alternative to conducting separate audits of different sets of controls. This can be referred to as an "integrated auditing" approach. In this integrated, comprehensive audit approach, the focus is simultaneously on financial, operational and IT controls and processes. The IAF has changed with ERP implementation and has expanded its scope.

6.5.2 Structure of the IAF

Internal auditors found in the ERP system the opportunity to improve their identity as the company undergoes radical changes. The ERP system rendered traditional control procedures obsolete; therefore, the value of traditional internal auditing has become seriously questioned. The IAF adapted as a response to the ERP system introduction through being an integrated and comprehensive audit that gathers many specialists from different areas. There is only one internal integrated audit department where IT, marketing, human resource and production and financial auditors are members of an integrated internal audit team. An internal auditor does not have to come from a financial background to join the internal auditing team.

Within the internal audit team, there are dedicated individuals for financial auditing, internal control checking, risk assessment, IT auditing, reviewing the segregation of duties and access rights and an IT security officer. There is a wide scope for the segregation of duties and the access rights controls; therefore, there is a dedicated person within the internal audit integrated team responsible for updating and

reviewing these controls on a monthly basis. This gives a stronger control environment. The senior internal auditor stated that:

> There is a person who is responsible for reviewing controls on SAP applications from our internal integrated audit team. This person has great insight on IT applications and responsible to categories the applications as a financial or not and assess risk types associated with it. Moreover, within the internal audit team there is a dedicated position for the risk management assessment. The IAF has been improved in order to add value by making it a comprehensive function with an integrated internal audit team. Moreover, auditors on business level should be aware of all business processes and functions, otherwise more specialists in each function added to the internal audit team to deal with the specific module. Nobody can gain the whole SAP knowledge. The SAP knowledge is knowledge per module or per function. I have knowledge in the finance area only. I don't have knowledge in the supply management for example. Therefore, the IAF was supported by experts in each function. In our case I see that the mix was needed. (Senior internal auditor)

The internal audit team is an integrated team that includes IT auditors and financial auditors. The IT auditors assure technical aspects related to internal controls within the systems, while financial auditors double check the controls' functionality by reviewing the financial outcomes. An integrated team facilitates IT areas to become part of the risk assessment process and annual audit plan. There is one comprehensive internal audit plan based on one risk assessment, and IT audit is a part of this plan. There is one integrated team to fulfil this plan and evaluate the control environment. Interviewees frequently asserted the importance of having qualified individuals in the internal audit integrated team through attracting and retaining high-quality individuals in internal audit positions. Individuals who have the audit knowledge and master IT are very significant. It is recommended that special attention should be given to developing an integrated team, where IT skills are embedded in it rather than just being the domain of the IT audit subgroup. Supporting evidence has been found through the interviews; the manager of the financial module stated:

> We have mixed experiences in the audit team, it is not only business process but there are also technical aspects. Therefore, there should be integration between the two levels, business level and technological level, to collaborate as one team. (SAP financial module manager)

> Technical risks after implementing the ERP system require adding IT auditors to the internal audit team in order to be able to manage these risks. The internal audit structure adaptation after the ERP system implementation can be summarised as follows: Internal audit team become an integrated audit team that is responsible for all ERP modules. No one internal auditor can have experience in all ERP modules areas. (The SAP vendor)

As integration became the standard after the ERP system implementation, the participants confirmed that the IAF that fails to adapt will become less valuable to their organisations. For internal auditing to be a valued business partner, it has to adapt with a sense of urgency. While IS was considered as a domain for specialised IT auditors, after implementing the ERP system it becomes the concern of all auditors. IT audits cannot be performed for the ERP system by auditing outcomes assuming that controls are properly placed. Auditors have to obtain additional evidence of the effectiveness of the internal control system to assure data integrity, system efficiency and asset safeguarding. An integrated IAF benefits both IT and generalist internal auditors. The IT auditors obtain knowledge from the generalists about business functions and financial reporting, while the generalists enhance their IT skills by working closely with the specialists. These changes are aligned with the normative pressures as the CIA confirmed:

> According to the International Standards for the Professional Practice of Internal Auditing, internal auditors must have sufficient knowledge of key IT risks and controls. However, not all internal auditors are expected to have the expertise of an internal auditor whose primary responsibility is IT auditing. Therefore, we have an integrated internal audit team to assure that we have the necessary set of knowledge. We can say that the mix of internal auditor's experiences has changed. The financial auditors set their queries in their own languages while the IT specialists translate it into their language to perform the mission. (Chief internal auditor)

One more point which is related to the IAF structure after implementing the ERP system is that younger internal auditors are preferred for membership of the internal audit team as they do not have the traditional mindset of auditing and they are more flexible for accepting change. This point has been observed at IC as most of the internal audit team is within the thirties age group. Interviews confirmed this as the external auditor stated:

> Most companies that have the ERP system, as IC, have internal audit team from younger age category. They are more enthusiastic to gain new knowledge and to improve their positions within the company. (External auditor)

The ERP system and governance compliance issues have forced many previously separate IT and auditing responsibilities to become closely coordinated. Since the ERP system was the brain of IC, internal auditors could not audit around them. The ERP system has been considered as a tool to assist compliance with requirements. It is time for internal auditors, general business auditors and IT auditors to integrate and redefine internal audit profession and be more effective. One integrated audit team can do the work of teams dedicated to different audits that are never ultimately integrated as it is a single team with shared objectives and a single integrated report.

6.5.3 Internal Auditors' Skills

The ERP system implementation improved the motivation for learning and raised competitive pressure among auditors at IC. Internal auditors had to adapt their looking at the business process from a functional view to a process view with the ability to know and understand the technicalities behind these processes. After ERP systems implementation, the ability to track business events through reviewing paper documents and assessing traditional internal control procedures are skills which are no longer of value. In the ERP system's working environment, innovative auditing, advanced consulting skills and collaborative efforts become essential. The internal auditors at IC are now advisors

more than inspectors. They do not look for errors but for improvement opportunities. Moreover, they have the ability to work in an integrated team rather than individually. A set of communication skills became crucial to success in an integrated internal audit team. When an IT auditor finds an IT control issue, it has to be linked by other internal auditors to business risks. The integration of applications in the ERP system has a great impact on the whole set of skills of internal auditors. Most of the participants confirm this. The head of the IIA chapter stated that:

> Internal auditors at IC have computer skills to know how to read data reported from software and how to run software. Auditors need to be increasingly competent in many different areas: risk and control analysis, financial analysis, computer technology, etc. These skills need to be recognised, which is most easily done through a system of certification. (Head of the IIA in Egypt)

> It was acceptable to have an internal auditor who is not a good user for computer applications. Now the ERP system brings a huge change, therefore the internal auditors who were not able to comply with the new work requirements had to develop their skills otherwise they may be lose their jobs. (SAP vendor)

The ERP system is complicated systems that need special and systems' knowledge in order to understand the business processes' reflections within the systems. Therefore, at IC some internal auditors were asked to get a certificate and pass an examination in order to be able to use the ERP system. However, not all the internal audit team members are required to have this licence. This is in accordance with the international standards pressures, where the chief audit executive must ensure that internal audit resources are appropriate, sufficient and effectively deployed to achieve the approved plan.

Involving the internal audit team in the ERP system implementation added to their skills more than training could do. During the implementation process, they learned what types of report they can extract from the systems and how to use the ERP system to maximise controlling features. Internal auditors now understand the security aspects

within the ERP system as a part of internal control system. Those who were not involved in the implementation were given the necessary training. They had to know the new fields and how to extract the reports they need.

> Definitely, to be an internal auditor in the ERP working environment one has to have system knowledge. We have something called T-code which is a combination of letters and numbers to get the wanted screen. Now we have different fields than before and a new way of data displaying. Not all the internal audit team, were involved in the ERP system implementation. After the system went life they have been trained how to do their tasks in the ERP working environment. They had been notified what is the meaning of the new fields and how to get the report needed. (Internal auditor)

Participants expressed the need for increasing the core skills of the general audit team so that they could better understand the new risks of auditing and for acquiring a more sophisticated knowledge for addressing IT-related risks. Technical skills are needed to conduct data analysis and to address enterprise-wide risk and governance issues. Internal auditors understand the impact of the ERP system on their work; therefore, they had to improve their IT skills because most of the work they do became related to the ERP system. They did not need to be specialists, but they had to have an up-to-date knowledge. Most of the controls are now based on IT. Therefore, the IT knowledge needed by all internal auditors includes basic IT security, authentication and system controls. The necessity for better integrating IT-related risks and controls knowledge in the set of skills needed for each internal auditor has been emphasised by the IIA in a range of publications from its International Advanced Technology Committee and in the 2008 Competency Framework for Internal Auditors.

6.5.4 Internal Auditing Tools

The ERP system implementation did not encourage the use of new special software for internal auditing; however, the ERP system

provides internal auditors with very helpful tools. Internal auditors use the ERP system as a tool to get reports, verify accounts, check balances, obtain the evidence reference for the audit work and do regular tests. The ERP system offered internal auditors exceptional reports when there is inappropriate usage on the system; tools to review conflicts in segregation of duties as a test that can be run regularly to check any conflict in using any code; various ways to find needed information; integrated reporting tools that give auditors the power to quickly identify the factors impacting the business and offer special reports to assure that business processes are running smoothly. The ERP system is considered by internal auditors at IC as a very effective tool to assure tight internal control environment that mitigates risks. The head of the IIA in Egypt said:

> The ERP system can be considered as an internal audit tool that made it possible to track and analyse more data much faster to follow up the implementation of governance rules and offer sufficient, reliable, relevant and useful information to achieve auditing objectives. (Head of the IIA in Egypt)

> The ERP system didn't require that the internal auditors use new tools. There isn't any IC use a professional internal audit application except the corporate audit team at IC London…There is no software used in the IAF to be a continuous auditing, however the ERP system gives the opportunity to add any continuous auditing software. (Senior internal auditor)

The reason for not changing the tools used by the IAF is that internal auditors do not yet exploit all features offered by the ERP system. Furthermore, the ERP system has been implemented recently and the need for using more advanced auditing software has not appeared yet. It is recommended that the IAF be provided with proper auditing software to improve its analytical capabilities. The ERP system offers the opportunity to implement any of the continuous auditing software. The implementation of auditing software is supported by the International Standards of Internal Auditing for exercising due professional care.

6.5.5 The IAF Sourcing

The ERP system implementation did not initiate a need for internal audit outsourcing, while it encourages having a fully qualified, integrated and skilled internal audit team. Having a qualified internal audit team was much preferable to outsourcing the IAF at IC. An internal audit team who had the experience with the company's problems before implementing the ERP system and the problems of the implementation stage was much better placed than others who do not have this experience. An in-house IAF had in-depth company-specific knowledge in addition to the ERP system implementation experience. Therefore, it was more able to identify ambiguities in the business than outsourced staff. IC strategy is to focus on staff having appropriate qualifications and experience, including the necessary specialised skills, industry specialisation and technological expertise. This has been confirmed in the interviews where the CIA stated:

> Our internal audit team participated during the implementation process of the ERP system. Therefore, we are more knowledgeable about the systems and implementation challenges than any outsiders. We got the enough experience about the systems. Therefore, the IAF is totally performed by our internal integrated team. (Chief internal auditor)

6.5.6 Internal Auditors' Relationship with IT Department

The close relationship between internal auditors and the IT professionals started with the ERP system implementation stage. During the implementation, cooperation started when defining the segregation of duties rules by internal auditors and applying them within the systems by IT professionals. After implementing the ERP system, most controls became automated and were set up by the IT team, while the IAF was still responsible for understanding and reviewing these controls. Auditors discuss with the IT professionals the actions taken to prevent failures and actions taken after receiving any alerts from the systems.

The working relationship between internal auditors and IT specialists becomes more integrated. After implementing the ERP system, the internal audit team became closer to the IT team; however, not all the internal audit team members have direct links with the IT team. This was a clear movement of the traditional internal auditors towards IT-related responsibilities. This phenomenon was observed in the organisation of both departments in one area to facilitate communication and confirmed by interviewees, such as the manager of the financial module who stated:

> The work relationship between the internal audit team and the IT team after implementing SAP is a mutual relationship. The IT team need the internal auditors advice, from the policy point of view, to put the internal controls needed and vice versa. (SAP financial module manager)

> If there is a serious risk which needs involvement in the systems, then the internal auditors call for the IT department support. If the internal auditors need to know what is happening inside the systems, where it pick that data from, what it combines together to provide them with the data or need to verify something they can't verify then they have to get back to the IT support team. As a result of the frequent friction with the IT individuals, auditors become interested to know how the problems are solved stage by stage. Implementing the SAP gets the IAF very close to the IT team. Each team now knows other team work. However, not all the internal audit team has the direct link to the IT team. For myself, I see that the SAP gets me very close to the IT. (Senior internal auditor)

However, internal auditors at IC suggested that they provide better assurance regarding data reliability when they have access according to their own expertise without assistance from IT department. When internal auditors access data themselves, there is less chance for corrupting or manipulating the data. Therefore, internal auditors needed to have skills to access, combine and analyse data from many sources independently.

6.5.7 Size of the Internal Audit Team

Although the ERP system reduced auditing efforts by providing embedded internal controls, assumptions implicit in the ERP system extended

the internal auditing scope and analytical processes. The ERP system implementation reduces the number of the traditional internal auditors. However, the internal audit team has increased as internal auditors from different backgrounds become needed. The ERP system implementation has caused an increase in the size of the internal audit team. Moreover, most of the individuals within the internal audit team have received more responsibilities. This increase in size has been confirmed through the interviews; for example, the CIA stated that:

> Actually, the number of the traditional auditors in our department is decreased. However, the number of the internal auditing team increased as we add some internal auditors from different backgrounds. Thus we can say that the mix of internal auditor's experiences has changed. (Chief internal auditor)

6.5.8 The IAF Budget

The ERP system implementation did not significantly affect the annual budget of the IAF; however, it increased the investment in qualifying the internal audit team at IC. Part of the ERP system implementation budget was dedicated to the improvement of the IAF. The budget of the IAF increased slightly as some specialists from different areas joined the internal audit team to form an integrated IAF. In the future, the IAF budget is expected to decrease as internal audit routine tasks become easier, faster and fewer. For example, the CIA stated that:

> Actually, the budget assigned to the IAF did not change yet; however it is supposed that from the next plan the IAF budget will go down. The reason is that after implementing the SAP systems many controls become permanently in place and automated. Therefore, the range of the internal audit testing is reduced. Consequently, the time and effort consumed in performing the IAF decreased. This for sure will decrease the IAF budget. (Chief internal auditor)

Individuals had the perception that implementing the ERP system should save money from the IAF budget, while implementing the ERP

system should be combined with improvement of the IAF. The IAF needs to attract skilled individuals, new analytical tools and training courses. Therefore, the IAF budget should be increased.

6.5.9 Internal Auditors' Relationship with the External Auditor

External auditors start by discussing the results of the IAF and evaluate to what extent they can depend on these results. In IC, there was a high level of confidence in the efficiency of the IAF; however, having the ERP system this confidence increased. External auditors counted on the work of the IAF. The external auditors were sensitive after the ERP system implementation as the whole business came within the IAF's scope and there was huge amount of change. The external auditor commented as follows:

> The relationship and communication did not change by implementing the ERP system. However, to be honest the improvements in the IAF after implementing the ERP system affect the external auditor dependence on the internal audit work. (External auditor)

> ERP system improves internal auditing accuracy and reliability and gives external auditors more confidence to depend on their work. Therefore, whenever they can use internal auditing work they decrease their effort and working hours. (Head of the IIA in Egypt)

6.5.10 The IAF's Strategic Response

The new logic of the ERP system has been imposed by the headquarters office outside Egypt upon IC in Egypt so that they can benefit from the ERP system's control principle and related assumptions through adapting practice and structures of functions. Therefore, the IAF faced strong pressures to adapt to the new working environment. The ERP system's pressures acquired more power from the support of the board of directors and the motivation of the internal auditors to adapt to the new working environment. This has been confirmed by interviews.

> I cannot say that internal auditors resist the requirements imposed by the ERP system as they are highly mature. Moreover, they have no option to avoid using the systems and change their way of doing auditing tasks. The option of using two parallel approaches was not there… The internal auditors were enforced to compromise with the new systems' requirements, there is no other option. (SAP financial module manager)

> The board of directors asked us to support these systems implementation and change all required aspects in our function to cope with and benefit from improving control efficiency. (Chief internal auditor)

> The internal audit team where enforced to go and start digging inside the system with the process experts more than before. (Senior internal auditor)

The auditors were asked to adapt in order to use the same language when dealing with other branches of MI in the same region, which had implemented SAP systems before. Internal auditors who were not able to conform to the ERP system's working requirements faced the risk of being fired. The ERP system offered the IAF an opportunity to improve and enrich its results to add more value as endorsed by the international auditing standards and the MI's internal code of business principles.

As perceived uncertainty increased after implementing the ERP system, the IAF tended to adapt as a way of maintaining legitimacy. Implementing the ERP system constitutes the stimulus for internal auditors to place more value on their professional identity. The internal auditors faced pressures from the ERP system at the functional level that mainly related to their shared professional values and trends. These pressures made the internal auditors adapt to advanced practice that developed outside IC. This is not to say that internal auditors at the functional level were totally powerless. On the contrary, for instance, it has been revealed that internal auditors not only recognise pressures, but they also raised technical demands in order to legitimise the new practice. The ideas for adaptation came from internal audit mangers at the functional level as they had a better understanding of how to combine competences to fit institutional demands. When there was insufficient information, management conformed to the practice of other

companies who they communicated with through professional networks.

When uncertainty increased over the new internal audit practice and structure after implementing the ERP system, the internal audit manager with the audit committee searched for new ideas from their professional communities to develop the function and imitate the practice already adopted by other IC branches. Their arguments for introducing new ways of working were drawn from their professional contacts and from international practitioner communities. They did not only consider the adaptation as a response to the ERP system working environment, but also as a response to normative requirements in order to be able to offer better control assurance and risk assessment.

The ERP system provided internal auditors with motives to improve their identity. The ERP system has patterns of activity rooted in material practice by which auditors reproduced and rendered their experiences as significant. This practice was available to internal auditors to further elaborate and use to their own advantage. While the ERP system constrains actions, they also provide sources of change.

Internal auditors' responded to the ERP in the beginning by adopting a compromise strategy through bargaining and balancing tactics. At the beginning, the internal auditors had a fear of the new systems because they thought that it might do most of their work and they might lose their jobs. The internal auditors' involvement in the ERP system implementation process gave them the opportunity to negotiate their requirements with the ERP vendors and consultants. During the implementation stage, internal auditors tried to customise the systems in order to be compatible with what they were familiar with. These negotiations have been found through internal and consultation reports and interviews; for example, the manager of the financial module stated:

> Auditors got the message that the ERP system will make things easy and things will go smooth. However, to achieve this result there were a need to do some reengineering to practice and structures but people tried to customise the systems to be compatible with their norms. There were some open negotiations to obtain an advantageous solution and a favourable position. (SAP financial module manager)

By having an integrated internal audit team, not all the internal audit team had to deal directly with the ERP system as a balanced solution. Some of the integrated internal audit team individuals got the certificate to do IT audit on the systems, while others did the auditing around the systems by reviewing outcomes. There were internal negotiations between the CIA and the internal auditors at the lower levels with the audit committee to reform the IAF after the ERP system implementation.

> Having an integrated internal audit team was a solution attained through discussion with internal auditors and audit committee after reviewing the structure and practise of the IAF in IC branches which had the ERP system before us. (Chief internal auditor)

Later on, internal auditors' response to the ERP system logic moved to an acquiescence strategy through compliance, habit and imitation tactics. The internal auditors were asked by the top management to comply with the new working environment. By the time the internal auditors accepted the new way of doing their job, they had managed it in a way that served their purposes. In the beginning, they sought help from the ERP system supporters. Once they acquired the knowledge to perform their missions using the new systems, they started looking for creative ways to improve their performance. When the ERP system offers better options, they accept it and adapt their practice to improve their identity. The internal audit management communicated with the relevant management to determine the best way to comply with the requirements of the ERP system. They made a conscious evaluation of the specific requirements and decided how to comply with them keeping the international guidelines in mind.

When the ERP system supports governance processes, they force individuals to change their habits. Individuals follow processes through the ERP application regardless of the underlying rules. The internal audit team faced pressure to gain knowledge of the system and change their working habits in order to secure their positions; otherwise, they might lose their jobs.

> The internal auditors were enforced to compromise with the new systems as there is no other option. Furthermore, they found that the ERP system implementation is a good opportunity to improve their position within the company by having the key systems knowledge. They consider it as a business control tool; therefore they will be the most important group within the company. (SAP financial module manager)

> After SAP implementation we are equal as we start using the audit international network within our company to copy their practice and structure. We have to use the same language to set on the same meeting table. The internal audit team, at the beginning, felt that there is a backup with something new may do their function. They thought that the ERP system will cover extra work that they should have done and it may cut short their jobs. Therefore, they were interested in understanding how to make the best use of SAP systems to support their position instead of let it erode their preservation. (Senior internal auditor)

Internal auditors followed the internal auditing model in the other IC branches which had implemented the ERP system successfully. They learned from these examples about the business threats and the adaptation to the IAF which was needed. Dealing with the branches in the same region which had already implemented the ERP system some time ago, encouraged the knowledge sharing process to improve the IAF. Moreover, dealing with the same consultant that was involved with other branches in the same region helped in transferring their model. This was confirmed through the interviews; for example, the senior auditor stated that:

> The IAF was responsible to redesign the business cycle and audit function as well to be more aligned to the other branches in other countries that implemented the SAP systems before. This was to learn from them about the issues we complain from as internal auditors such as business threats, what are the important changes that should be done in the IAF in order to add value in the ERP system environment? Capgemini consulting services and working on a regional basis with other IC companies which went SAP life help in knowledge sharing… The approach of IC, on a global scale, in implementing the ERP system and the IAF has the same requirement in any region. Therefore, in Egypt the requirements

are simply copy and paste from the global requirements of the global IC. (Senior internal auditor)

Later on, the fear was gone as the internal auditors gained confidence that they could achieve the same outcomes that they expected from the previous systems. The internal audit team started searching for different ways to get what they needed and explored the different barriers in each way. Although the IAF has only read access to the system, understanding how data are entered and how to extract it in different ways was very important.

6.6 Legitimacy of the IAF After ERP Implementation

Internal auditors as organisational actors aimed at maintaining legitimacy in their environment in order to be accepted and to ensure their profession survival. Internal auditors adapted to maintain legitimacy for their activities. Therefore, the changes themselves should be made legitimate. From an institutional perspective, this quest for survival through legitimacy helped explain why managers and internal auditors choose to conform to pressures.

To maintain the IAF's legitimacy was to justify its right to exist as an important corporate governance tool which is able to assure an effective internal control system that is able to mitigate risks. Internal audit is no longer about finding errors. The IAF adds value to organisations and stakeholders when it provides objective and relevant assurance and contributes to the effectiveness and efficiency of governance, risk management and control processes.

6.6.1 Ability of the IAF to Provide Control Assurance

After the ERP system implementation, the IAF at IC became responsible for assuring the functionality and the effectiveness of internal control systems in mitigating risks, whether controls are manual or IT

controls. Internal auditors played an important role in assuring controls on the integration of the ERP system with other systems. Moreover, there was a change in the focus of the IAF from merely assuring the functionality of controls to assuring the existence and functionality of compensating, segregation of duties and access rights controls through the systems.

The interviews revealed that the IAF adaptation assists in maintaining effective controls by evaluating their effectiveness and by promoting continuous improvement after the ERP system implementation. The IAF became responsible for ensuring that the controls of the ERP system function as required and serve internal auditing needs. The IAF did not only assure the effectiveness of controls applied in the ERP system at the implementation stage, but also assured each change in the internal controls according to the changes in the business needs.

Consequently, the IAF was able to assure the effectiveness of any new controls applied within the ERP system at any time to mitigate risks. The ERP system tightening supported the reliability of internal auditing evidence. The interviews revealed that the IAF adapted in a way that made it capable and legitimate to assure an effective internal control environment after the ERP system implementation.

> Our internal audit team audits all controls in place whether they are in the systems or outside the systems to assure that they are able to mitigate risks. The internal auditors insist to view some examples of actions for each control breach and sample of the actions have been taken. Internal auditors make survey to rate the applications and according the scores to determine the certain type of controls needed. Now the existing internal audit team is very qualified to add more value than other. As business needs are changing quickly, the IAF always take new actions as a response. (SAP financial module manager)

6.6.2 Ability of the IAF to Support Risk Management

Internal auditors played an important role by assuring that internal controls were effective enough to mitigate the risks they assessed. The IAF assessed risks based on likely exposure frequency and the impact on

the business in monetary value. Based on this assessment, the suitable internal controls were addressed. The adapted IAF was capable of assessing sources of risk and helping to mitigate these risks effectively. The internal audit team included individuals who were responsible for supporting the risk management process. The internal audit team assess all types of risks involved in IT application whether it has financial impact or not.

The adapted IAF at IC had a risk-based approach. It aligned audit efforts with management objectives and reduced exposure to risk by focusing attention on areas of weakness. It aimed to increase accountability by ensuring transparency, validating key controls and committing resources against key risks. The ERP system required greater competencies; thus, internal audit has had to become ever more professional to assess risk, deploying resources in a logical way to address these risks. The interviews revealed that the internal audit contributed to the improvement of risk management processes. The internal audit evaluated risk exposures relating to the ISs regarding the: reliability and integrity of financial and operational information; the safeguarding of assets and compliance with laws, regulations, policies and procedures. For example, the consultant stated that:

> Internal audit team at IC knows the risks and understand what controls are needed in place to mitigate these risks… Technical risks after implementing the ERP system needs to add IT auditors to the internal audit team in order to be able to manage these risks. This is what happened in IC. The new risks after implementing the ERP system are related to the access rights… the IAF supports the risk management through the Operational Control Assessment (OCA), which requires a comprehensive risk-based assessment. (ERP implementation consultant)

6.6.3 IAF Importance After Implementing ERP

The study found that the ERP system could not be considered as a governance tool, unless internal auditors get involved from the early stages of implementation. Internal auditors at IC became sophisticated users of the ERP system not naive users of IT applications as previously. This

gave the IAF high and respected position within IC. The ERP system implementation by itself did not change the internal audit position; however, the role played by internal auditors during the ERP system implementation process and the adaptation to benefit from the ERP system raised their systems knowledge. Consequently, the value of the IAF and the prestige of the internal auditors within IC were increased as observed by the researchers.

The new image that the internal audit team tried to spread is that the internal audit team by drawing attention to deficiencies make apparent opportunities for improvement. The IAF always received feedback about what was done with its recommendations. The IAF was the maestro who was keeping harmony among the corporate governance external and internal rules and policies, the ERP system and business process. This was confirmed through the interviews.

> The IAF has got a great prestige within the company, especially after their effective role in the successful implementation and stabilisation of the ERP system. ERP system supports the IAF position as an important corporate governance tool. The ERP system gives users more confidence in the internal audit reports. The ERP system implementation provides the IAF a great opportunity of improvement. It improves internal auditing accuracy and reliability. The company gives more weight for the IAF than ever before. The ERP system provides the IAF with unprecedented opportunity to prove its ability to add value. (ERP implementation consultant)

Traditional internal auditing has become inefficient as the ERP system altered the business landscape. New practice and structures were needed to help internal auditors obtain the in-depth business knowledge required to assess the financial implications of new business relationships and activities. The ERP system has given internal auditors access to a new discourse about assurance. As internal auditors get better evidence about controls and performance indicators, high-value assurance tasks were expected. The ERP system enhanced the aspirations of internal auditors and their efforts to maintain their legitimacy based on governance initiatives.

These adaptations in the IAF in terms of practice and structure became a comprehensive and integrated internal audit which helped to maintain its legitimacy. The key to legitimacy appeared to lie with the pragmatic or moral dimensions. Pragmatically, the internal auditor's self-interest was served by adapting their function to improve their prestige in the organisation which, in turn, improved their legitimacy. The legitimisation of the IAF's adaptation had a self-satisfying component for internal auditors, where "the absence of negative 'problems' is more important than the presence of positive achievements" when adapting to maintain legitimacy (Deephouse and Suchman 2008, p. 60). They believed that adapting to avoid losing their identity is more important than the positive expected results.

Moreover, moral legitimacy has also been achieved because the adaptation of the IAF is aligned with the prevailing normative prescriptions, as there was a belief at IC that the IAF's adaptation to its structure and practice were the right things to do.

Developing and enforcing practice standards and technical guidance would legitimate the profession's claim to conduct its work in a professional manner. The legitimacy of the IAF as a profession rested in part on an acceptance that individuals are rational and knowledgeable. The IAF's prestige within IC lays in being judged as creative and value adding. The adaptation of internal auditing to the precepts of a business advisor about adding value promised to enhance the status of internal auditors. It appears clear that the adaptations of the IAF have been legitimised to some extent, though this might yet only represent a temporary episode. It can be argued that it has not reached the cognitive legitimacy, where other alternatives are unthinkable (Suchman 1995, p. 583).

6.7 Case Study 1—Conclusion

The coercive pressure related to the IAF was very weak in Egypt. The normative pressures asserted that the IAF should play an effective role in control assurance and risk management to be a legitimate one. These pressures became coercive through being formalised as internal policies

imposed by the head office outside Egypt. The mimetic process was facilitated by having an international auditing professional network, which gave the IAF the way to adapt.

The ERP system imposed new interlinked control assumptions such as data consistency, preventive controls and transparency. Internal auditors were aware that the internal controls changed after implementing the ERP system based on these assumptions to be integrated, automated, standard and multidimensional and the imposed pressures to change the way IAF responsibilities should be carried out.

IC considered the ERP system as part of governance improvement. There was a strong plan for change management, and internal auditors were involved as a governance mechanism; therefore, the IAF change was a part of the change management process. Illegal procedures were reengineered as they could not be customised within the systems. The ERP system was customised to comply with the Egyptian business environment, especially with taxation and controls.

Internal auditors exploited the ERP system by extending their areas of involvement. The ultimate adaptation of the internal audit practice is that it became an integrated comprehensive audit in which controls are covered during end-to-end audits of the related business areas to mitigate related risks. This audit's approach focused simultaneously on financial, operational and IT controls and processes; therefore, the audit team gathered many specialists in different areas. A set of communication and consulting skills became crucial. Involving the internal audit team in the ERP system implementation added to their skills. The ERP system did not encourage using new auditing software; however, internal auditors were provided with helpful tools. The ERP system did not initiate a need for audit outsourcing, while it encouraged having a fully qualified, integrated and skilled internal audit team. After implementing the ERP system, the internal audit team became closer to the IT team; however, not all the internal audit team members have direct links with the IT team. The ERP system implementation has caused an increase in the size of the internal audit team. The IAF budget increased slightly. These changes were aligned and with the normative pressures. These findings are summarised in Fig. 6.1.

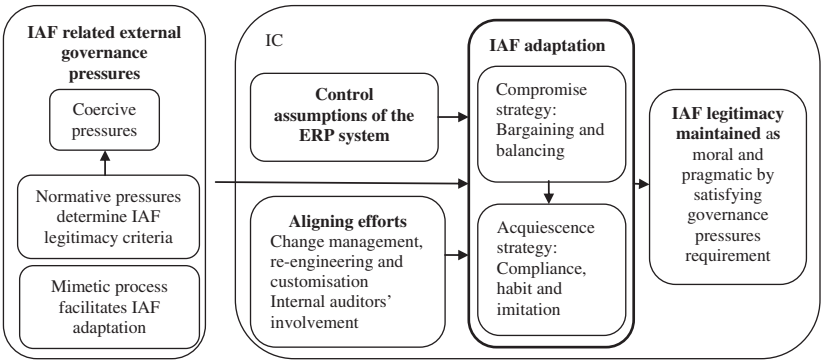
IAF related external governance pressures
Coercive pressures
Normative pressures determine IAF legitimacy criteria
Mimetic process facilitates IAF adaptation
IC
Control assumptions of the ERP system
Aligning efforts
Change management, re-engineering and customisation
Internal auditors' involvement
IAF adaptation
Compromise strategy: Bargaining and balancing
Acquiescence strategy: Compliance, habit and imitation
IAF legitimacy maintained as moral and pragmatic by satisfying governance pressures requirement

Fig. 6.1 Case study 1—summary of the main findings

As perceived uncertainty increased after implementing the ERP system, the IAF tended to adapt as a way of maintaining legitimacy. Implementing the ERP system constituted the stimulus for internal auditors to relate the ERP system to their roles and responsibilities and thus their professional identity. Internal auditors did not only consider the adaptation as a response to the ERP system working environment, but also as a response to normative requirements in order to be able to offer better control assurance and risk assessment. The internal auditors' response moved over a period of time from a compromise strategy to an acquiescence strategy. These adaptations helped to maintain its legitimacy. The key to legitimacy appeared to lie with the pragmatic or moral dimensions.

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7

Findings from Case Study 2—the National Company (NC)

7.1 Background and Overview

NC is a group company with a listing on the Egyptian stock exchange. It is an Egyptian group that is known for its wide range of high-quality fresh and frozen products in local Egyptian and export markets. The company was founded in 1985 and has grown annually since then to its present position of strength in both traded and manufactured products. The group employs over 1500 people and has trained staff to offer the best possible service to customers and business partners. The group is active in the production and marketing of a range of products that include ghee, butter, cheese, milk and juice.

The group comprises:

- NC for international investment established in 1985, which provides frozen butter, fish, chicken and liver
- NC for food industries established in 1999, which provides natural nectars, UHT milk, ghee and butter
- NC for food products established in 2004, which provides cheddar and processed cheese.

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Table 7.1 NC interviewees and other sources of evidence

The positions of the interviewees
Financial manger
Internal auditor
Accountant
SAP manager
Two members of the SAP vendor team
External auditor (local external auditor)
The head of IIA in Egypt
Focus group with the IT team (four members)
SAP implementation consultant
Sample of documents: Egyptian corporate governance code, Corporate Law (159), Capital Market Authority Law (95), SAP ERP application guides and internal reports.
Sample of observations: relationship between the IAF and other departments, arrangement of the internal audit department, availability of internal audit job descriptions and manuals.

NC introduced SAP as its ERP system in 2010. The company implemented financial accounting, sales and distribution and human resources modules. Nine interviews with the stakeholders and one focus group were conducted, and all related documents and observations were analysed as summarised in Table 7.1. In the following subsections, the findings related to each construct of the conceptual framework will be presented and discussed.

7.2 IAF-Related Governance External Pressures

The IAF provides significant value in all areas of governance; therefore, it is required to maintain its independence and objectivity. At NC, the IAF has no interaction with the audit committee and it is not independent as it is subordinate to the financial department.

7.2.1 IAF-Related Coercive Pressures

As discussed in detail in case one, there are no rules, laws or regulations in Egypt to determine what the IAF should do or even require having an IAF at all. The only compulsory governance rules and regulations are

issued by the Capital Market Authority asking listed companies in the stock market to have an audit committee without mentioning anything directly about the IAF. Otherwise, there is no law for organisations to compel them to have an audit committee or an IAF. Moreover, there was no internal policy or code of conduct at NC to ask the management to keep an IAF. As it was observed, there was no clear job description or internal audit manual within NC. The IAF at NC had very loose rules; therefore, internal auditors follow invisible and customary norms.

As a way of enforcing NC to have an adapted IAF, the external auditor issued a management letter clarifying the importance of having an adapted IAF especially after the organisational change occurred in NC with the ERP system implementation. The management letter concerned with the managerial issues such as points related to internal controls and insufficiencies in internal auditing, which cannot be raised in the audit report. However, no action was taken in response to this letter which was issued recently. This was evidenced in the management letter and interviewees such as the external auditor, who stated that:

> The external auditor put pressures on the management to have and maintain a well-developed IAF in order to add value through assuring the internal control effectiveness. The external auditor mentioned the need for improving the IAF when changing the business process or when there are a lot of new control issues such as what happened after the ERP system implementation. (External auditor)

As a listed company, NC is required by law to have an audit committee that should revise and support the efficiency of the IAF. Conformity with rules and laws occurs seeking legitimacy; however, this conformity could be by appearance rather than essence. Therefore, NC had an audit committee that was not activated at all and consequently there is no IAF support within NC. Therefore, it is recommended to have compulsory laws and regulations to enforce companies to maintain a good IAF.

7.2.2 IAF-Related Normative Pressures

These pressures depend on values and norms as the basis of social obligation. Values and norms in Egypt support the traditional view of

the IAF, where internal auditors are the watchdog. There is no strong Egyptian professional institution to prescribe an internal auditing framework. The IAF at NC was not appreciated as a profession; therefore, internal auditors collectively struggled to define the conditions and methods of their work, set up a cognitive basis and seek legitimacy enhancement. Most forms of internal auditing professionalisation such as formal education or professional networks are weak in Egypt, where new models of modern IAF cannot easily emerge. The common theme in Egypt about the IAF is that it is considered as a function and its main role is to find errors. The internal auditors' knowledge about the internal audit standards is very poor. Internal auditors focus mainly on compliance. Evidence for these conditions was found in the interviews.

> There is a problem in the education systems that educate only whatever have been used in the past and give no attention for the market needs. The IAF results are intangible and indirect and hard to be measured; therefore the NC management put the IAF in low rank while it is should have better attention as it is important function. The IAF is very hard to be improved in a society don't follow the scientific approach in education or management. Therefore, a continuous education system for internal audit profession should be made compulsory. (SAP implementation consultant)

7.2.3 IAF-Related Mimetic Pressure

The absence of cultural-cognitive pressures of governance regarding the IAF resulted in shared misconceptions that constitute the social reality about the weak role of the IAF. This reality about the traditional IAF practice was constructed through interaction of internal auditors to create interpretations of what was going on in other companies. Therefore, mimetic pressures explain the common theme that the internal audit is not an important function. This explains how IAF structures and practice are shaped not only by technical aspects, but also by cultural rules promoted within the external environment.

> The working environment in national companies such as NC is characterised by uncertainty. There are not clear written objectives, working manuals, plans, strategies for improvement, job description, transparency or reward and punishment rules. Nobody knows how his work may affect the overall company goals. It is a chaos working environment. Moreover, they do not give the IAF the proper weight or support. They maintain the traditional view of the IAF as inspection function. Therefore, the IAF effectiveness depends to large extend on the individuals' qualifications and awareness of the importance and the developments of this function. (The head of the IIA chapter)

Therefore, the IAF moved over a period of time to be more like what it was in other organisations through imitation. The wider belief systems about the accepted traditional auditing are adopted by IAFs to deal with uncertainty or ambiguity. NC tended to imitate other models to avoid being different. Mimicking other acceptable models is perceived as improving its chances of survival (Khadaroo and Shaikh 2007). Survival is related to achieving legitimacy based on the cultural support of what is considered correct. Therefore, at NC there was no a clear role model for the IAF to follow.

7.3 Control Assumptions of the ERP System

The ERP system could play a significant role as a carrier for change in taken-for-granted practice and underlying norms across the internal auditing field. The ERP system through practice inscribed into them is material carriers of the logic of beliefs, norms and rationalities about how best to structure different kinds of business activities. ERP-embedded logic is claimed to be globally valid; however, it may not automatically transfer the global logic of actions into the practice of the adopting organisation as was the case at NC.

One of the main motivations for NC to implement SAP systems was to enhance the weak internal control system, to mitigate the financial risks of manipulation and theft and to improve cost control. For organisations that had chaotic processes such as NC, when implementing the

ERP system, the business process has to become organised with better controls. The ERP system offers a strong accountability system and reduces human intervention. If the ERP system was applied properly, most of the illegal and unacceptable practice should have been stopped, as supported by interviews.

> We had practice in our company such as raising the accounting profits to get a loan from banks and reducing the accounting profit for taxing purposes. If we applied SAP properly, most of this illegal and unacceptable practice should be stopped. Most of this practice is preferable by the management. (Financial manager)

In this section, the ERP system is explored focusing on the process of translating the assumptions behind the ERP-embedded principle of control in the NC context. Therefore, data codes identify the meanings and expectations that different groups were expressing about the assumptions behind control logic of the ERP system as following.

7.3.1 Automation

The ERP system turned the business processes into being automated processes; therefore, the ERP system reduced human intervention and errors. The automatic reflection of the material and products movement on the accounting records reduced the errors in the financial records to a minimum. The ERP system controlled the processes based on using a single data entry point, and all subsequential data processing is done automatically. Most of the participants stress this point:

> Errors in the financial system could be zero as the non-financial action automatically creates the financial entry that translates the financial impact of this transaction into the financial records without human intervention. SAP automates all HR and payroll calculation as the working hours are calculated automatically based on the finger print for each employee. Therefore, one of the most important assumptions of control in the ERP system is that they depend on controlling one single point of entry. Data are entered once to the system and no one enter these data

> again. Once the data entered the system it will affect all related modules automatically. (IT team member)

One of the motivations to implement the ERP system, at NC, was to have an automatic archiving system for transactions, assets and HR records instead of a manual and paper-based system. The ERP system absorbed all related rules and automatically enforced their application and automatically applied the segregation of duties. Automation affected the IAF practice since the system does most of the traditional checks which used to be done by auditors.

7.3.2 Centralisation

The ERP system gathers a transactions' information from many areas. The financial module centralises all financial data that is not shared with any other module. By having a centralised data source, transparency and visibility were increased for all branches and the accuracy of the financial information was increased. Therefore, data centralisation could have a direct impact on auditing practice since it collects all the needed information for auditing purposes in only one source. Evidence was found for this through interviews; for example, the SAP vendor stated that:

> The ERP system saves all data into one central database and makes the data available for all needs. The financial module is a pool that is affected by all transactions take place in all other modules. This centralisation has a great impact on the data accuracy and considered as a great support for monitoring. (SAP vendor)

7.3.3 Continuous Timely Monitoring

The ERP system offered tools to do continuous monitoring of employees' activities and data processing on systems. By the systematic tracking of transactions' details in real time individuals could be continuously monitored. Real-time information disrupted norms of control by action. The ERP system offered easy access to information mostly

developed in real time through the integration across the organisation. Therefore, at NC, the ERP system has made many of the internal auditing practice redundant through their continuous monitoring functionalities. Actually, the ERP system increased the inter-dependability of work processes and increased the importance of peer reviewing.

> We have a new assumption for control which is the continuous peer review process. It is a must that no single process moves forward through the system unless each employee reviews the previous work, which is already approved by others and accepted according the criteria, embedded in the systems. Therefore, there are fewer roles to be played by the internal auditors. (IT team member)

The visibility of performance can be greatly enhanced if data are analysed in real time, in finer granularity and in multiple dimensions. Although the ERP system can offer reports in real time, auditors at NC did not use such real-time information, systems' notifications or options for continuous monitoring. The participants confirmed the importance of the options offered by the ERP system; however, they highlighted that auditors did not utilise them.

> The ERP system offers flexible reports that can give the internal auditors full view of the whole business process. It offers the internal auditors easy access for different views and angels for the same business process in the real-time. The internal auditors should use the systems to get whatever reports they dream of, these are integrated and on real-time. Internal auditors always ask for these kinds of reports after about one year of use; therefore nobody at NC asked for these reports. (SAP vendor)

Most of the participants suggested that utilising real-time reporting functionality and portals can empower auditors. While traditional internal auditing was often based on a detection after-the-fact mechanism, the ERP system can help in moving forward through more preventive and continuous monitoring of fraud and misconduct. The ERP system can offer new modes of evidence gathering and the infrastructure for applying continuous auditing.

7.3.4 Data Consistency

The integration brought by the ERP system offered large amounts of consistent operating data from traditionally separated operating environments. This was in contrast to data redundancy that NC had through having scattered data in numerous systems and documents. Via integration of processes, the consistency of data with activities has increased. The data warehouse in the ERP system supported the monitoring capabilities as data describing the same event became consistent. Accounting information became based on event-driven business data. The ERP system reflected the reality of the business process in details from start to end in a consistent accounting format. The participants emphasised the controlling benefits from the assured consistent financial and operational data for auditing purposes; however, the IAF did not adapt to utilise this.

> SAP systems offer very consistence data reports of production, sales, procurements and financials and compared reports with data of previous years… By default, ERP system offer consistence information that should be exploited in recommending the business process improvements opportunities. These features should be used by a good IAF, but who cares. Internal auditors get a full picture of the puzzle that every employee has entered very small piece of it with the ability to know who bring in each piece, when and why. (SAP implementation consultant)

7.3.5 Data Security

Data security in the ERP system is a mechanism that incorporates security features (confidentiality, authentication, integrity and non-repudiation) when accessing, exchanging and interacting with data sets. At NC, data quality and data security were very poor and there were few mechanisms to address these issues. The ERP system helped reduce data redundancy, standardise interfaces, enable global access and improve data security. A piece of evidence found in the interviews was as follows:

> …The data once entered to the system can't be modified and it is securely preserved. During the ERP system implementation, it was critical to implement controls that assure data security. The ERP system focuses on data security through gateways that focus on managing and analysing a user profile from the sign up, data modification and end phases. Auditors should consider the overall set of security functions… (IT team member)

Auditors' main concern has to be the security of financial data because when data security processes are missing, integrity is threatened. Security in ERP requires a new way of thinking about security, not just about the network traffic, but about business transactions that inflict financial losses from systems-based fraud, abuse and errors. This emphasises that it is essential for internal auditors to consider data security issues while assuring the control system; however, this was not the situation at NC.

7.3.6 Control Through Integration

With the ERP system implementation at NC, many functions that were carried out independently were made inter-dependent through increased integration. The ERP system promoted information integration across the organisation without inconsistencies. This was supported by in the interviews by the ERP manager who stated:

> We hadn't any software to manage accounts payable, receivable, inventory, purchasing and assets, etc. This was the motivation to have one system to manage the whole business process… SAP systems integrate HR, accounting, production, costing, sales & distribution and CRM, etc. Our group is divided into three companies. The ERP system integrated the data of all three groups in only one database. (SAP manager)

Integration enhanced the internal control through the dependability of the business process that requires peer reviewing. Therefore, any error was discovered by the next user in the process. Integration supported the accountability system within NC and raised the information accuracy and consistency. Integration consolidated the results of

NC companies and therefore helped in the control of multi-company transactions. Participants confirm the importance of this integration for internal control and audit.

> …Once the data entered the system it affects all related integrated modules on real-time……The ERP system integrally runs all the financial cycle based on the movement of material and goods.… Accounting entries automatically produced based on the real business process. There is no one enter a full accounting entry. (SAP vendor)

Through integration, a single database, non-redundant and better information quality, the ERP system facilitated the tracking of accounting information and created a comprehensive set of updated and consistent data to be used for audit purposes.

7.3.7 Multiple Methods of Control

The ERP system integration resulted in multiple controls over the same data by different parties throughout the business process. A key feature of the ERP system was the use of built-in multiple controls, where controls were employed simultaneously. The ERP system runs all the financial cycle based on the movement of material and goods however separate the physical transactions are from their financial impacts. All users have to review others' previous work in the same cycle. With the ERP system, control became the responsibility of everyone. However, NC did not use all the control possibilities offered by the ERP system.

> SAP systems close the cycle by bringing all the data of inventory, production, sales and accounting adjustments all together in an integrated and consistent way to assure that many controls are active. All users turned to be auditors for others in the same process cycle on the systems. The ERP system reduces errors as each transaction is done by many employees. One enters the data, one approves and one validate. Therefore, each data entry can be reviewed once, twice and sometimes three times. (SAP manager)

7.3.8 Preventive Controls

The ERP system automated and integrated most business processes, resulting in many of the controls becoming automated as well. Automatic controls are preventive more than detective controls. Examples of preventive controls included authorisation lists, segregation of duties and automatic strict application of prior supervisory approval. This assumption was confirmed from the technical participants; for example, the SAP vendor stated that:

> The ERP system is very powerful governance tools that apply tight access control and authorisation processes that assure that no action will take place unless all prerequisites are met. (SAP vendor)

> SAP systems prevent posting an invoice amount to a costumer other than coded into the invoice therefore such error possibility is zero. Furthermore, SAP systems prevent posting to previous period or making a purchase order to a supplier who delivers faulty items or material before. SAP very strong in turning the internal control system to be preventive not only on financial process but also in operational. For example, the systems never allow a production order to go through the system to the production line unless there are all needed materials to produce the whole order available in stock. Therefore, the production line never stops because of shortage in materials. Moreover, the schedule of the machines maintenance is run automatically on the system to prevent any delay. I mean that the SAP prevents many operational risks. (IT team member)

The ERP system through tight and well-defined access controls and authorisations automatically preserved the segregation of duties rules. ERP systems did not improve the internal control systems at NC so as to be preventive as internal auditors did not use the control features of these systems. However, the ERP system implementation initiated the need for determining the responsibilities for each user as the work environment was chaotic beforehand. Evidence was found for this need to determine responsibilities through internal documents of job descriptions and supported by interviews; for example, the financial manager stated:

> To be honest we did not have in our company one manual that gathers all policies and procedures in one booklet or job descriptions. With the ERP system implementation we started having documented process that determines all procedures and duties for each function. (Financial manager)

> Automation has a great impact on the internal control systems through preventing many kinds of mistakes. However, the ERP system didn't improve controls at NC to be preventive as they do not use or understand the full controlling features of SAP systems…This could be because the absence of the role of internal auditors. (SAP implementation consultant)

7.3.9 Standardisation

The ERP system standardised the IT infrastructures across functions, which facilitated information sharing and business activities integration. The ERP system allowed standardising some of the activities within various locations at NC. Thus, the IAF could improve its monitoring, inspecting and its ability to govern business activities. NC did not standardise the majority of the business processes as there were some preferable processes that could not be standardised through the system since some of them are illegal. This problem was illustrated by participants, such as the ERP manger, who mentioned:

> If the ERP system is implemented and used in the proper way it should eliminate many illegal and unacceptable practice as it apply the best practice; however NC asked not to activate many processes on the systems as they want to do it around the system. (SAP manager)

7.3.10 Transparency and Visibility

The ERP system created procedural sequence with wider visible structure of data and operational relations. The ERP system had a profound impact on operational information flow and data transparency. The greater visibility of information was provided by the shared database of the ERP system that centralised the master data and resulted in

data interdependency. Therefore, the ERP system enhanced visibility to management and to peers through workflow dependency and data interdependency. The ERP system implied some changes in the form of accountability that used to be practised at NC by making what used to be invisible, traceable and visible. That this change took place was supported by the SAP vendor:

> The centralised data source increases the transparency and the visibility for all branches. Once data is entered anywhere in the company, it can be easily viewed on real-time. (SAP vendor)

The ERP system enabled visibility of workplace behaviour as workers are visible to their peers. Accounting numbers in reports reflect operational performance and make it visible and controllable. The assumption that greater integration and visibility afforded by the ERP would enhance transparency was problematical at NC. While regulations require transparency in the operational processes and the data that make up financial statements, NC was not yet ready for the transparency offered by these systems. The top management wanted to preserve the information confidentiality even from the accountants. They did not want their suppliers, purchasing prices, customers and profits to be known. Therefore, the visibility was supported at the peer review level but prohibited on higher levels. As supported by many, the consultant stated:

> Misalignments were not because of the ERP system is not suitable but because of many diseases we have in the Egyptian business environment. Tax evasion is one of the diseases. Moreover, the top management wanted to preserve the information confidentiality even from the organisational actors. This means that they are anti-transparency of information. There wasn't any encouragement to increase the transparency, while the ERP system basically increases the transparency. As a result, when NC manufacturing company was implementing ERP modules, managers refused to reveal the components and ingredients of the products to be on the system claiming that it will be very risky to save this information on the systems. The ERP system enforces more transparency and standardisation,

while NC was not ready for this practice. (SAP implementation consultant)

7.4 Aligning Efforts Among ERP, Governance and the IAF

The ERP system is vital in achieving sound governance that aims to ensure transparency and control of all business activities, proper levels of accountability, clearly identified structure of responsibilities and attention to risks. However, the ERP system collided with management philosophy since the management did not perceive the need for ERP to be very great. The practice at NC is not in alignment with the proper governance as the top management does not want the transparency and standardisation offered by the ERP system. Therefore, NC failed to benefit from all the governance enhancement aspects brought with ERP implementation. The ERP system could enhance the governance practice and the internal control systems; however, this does not happen unless the top management wants and encourages this through improving the IAF to make the best use of the systems. As supported by many, the consultant stated:

> NC implemented the ERP system to benefit from the governmental rewards according to Industrial Modernisation Programme. This is a big programme that funds 80% of the cost of implementing the ERP system. As there is free fund there is abuse. Companies ask for fund even they don't need the systems and are not ready to have the system. NC has got this fund to implement the ERP system… NC needed huge efforts to implement the ERP system as it was not ready in managerial terms. NC faced huge gap between the way of practicing and the way supposed to be implemented according to the ERP system. The ERP system enforces more transparency and standardisation, while the company was not ready for this practice. The implementation of the ERP system at NC had many problems; therefore after going live there were some errors, interruptions and delay for the business process. (SAP implementation consultant)

7.4.1 Change Management

The ERP system implementation involved shifting from a rule-breaking, flexible and individualist culture to a standardised and integrated way of doing business. However, the required changes were not made clear at NC, nor were the rationale of these changes communicated. Change is more acceptable when individuals view it as being for the better. A source of great difficulty was mismanagement of the scale of change required in implementing the ERP system joined with mangers' low level of awareness.

The internal control environment after ERP system implementation changed; however, internal auditing had not been informed about these changes. Changes in the organisational structure brought with the ERP system implementation reduced the importance of the IAF as there was no change management plan. This theme was common in the interviews; for example, the IT team stated:

> Most employees feared that the system will substitute them and will do their functions and this exactly what happened in the internal audit department. However, we tried to mitigate this risk by telling employees that the system is coming to facilitate their jobs and it will not work without them, these were individual efforts as we didn't have a proper management plan for this kind of change. (IT team member)

> After the ERP system implementation the organisational structure has been changed … The head of each process is fully responsible for internal auditing related to all transactions and functions related to this process and as a financial manager I am responsible for monitoring and follow-up. Therefore, there is no need to have a separate IAF. The IAF has been merged into the organisational structure. (Financial manager)

7.4.2 Reengineering and Customisation

There may be some misalignment between the functionality offered by the systems and that required by the implementing organisation. As a result, NC had to choose among adapting to the new functionality, living with the shortfalls, arranging workarounds the system or

customising the systems. The ERP system offered a stricter internal control environment than the relaxed one at NC. Therefore, NC arranged some ways to work around the ERP in order to keep the preferred practice. These workarounds provided the needed functionality without modifying the systems through manual solutions and finding alternative ways to perform functions outside the systems.

In some areas, such as cost control, there was a motivation to adopt best practice, but in others, such as taxation, there was a motivation to work around the ERP system to keep the old practice. These practices were mentioned in the interviews by many; for example, the ERP manager stated:

> We faced many problems and challenges. For example, the practice in the payroll module was different from the rules and regulations in Egypt; therefore we had to make many configurations in this module. We have something called casual employee, who is recruited, started work and paid for without any formal contract. We manage this situation through working around the system by making a special pay code for those employees to pay them until their situation is settled. (SAP manager)

7.4.3 Internal Auditors' Involvement in ERP Implementation

At NC, internal auditors had no role at all to play at any stage of the ERP system implementation. Since there was no appreciation of the importance of this function, it has not been involved in the implementation. Moreover, the management had a perception that IT auditors only can be involved in the implementation; therefore, no internal auditor joined the implementation team as NC had no IT auditors.

While the internal auditors had no role at all in the ERP system implementation at NC, almost all the interviews emphasise the importance of involving internal auditors in the implementation, but only if they were qualified. The involvement of internal auditors could enhance the ERP system impact on improving the governance process within NC. The internal auditors could assure the authorities given to each employee, assure the implementation of segregation of duties rules and

provide advice about appropriate internal controls. Moreover, internal auditors' involvement could have a significant impact on their understanding of the systems details and give them useful experience about the business processes through the system. For example, the IT team member stated:

> There wasn't any role played by the IAF during any stage of the implementation process.…The internal auditors in NC had no impact at all on the ERP system. Internal auditors in NC hadn't any IT background; therefore they didn't participate in the ERP system implementation. They didn't have anything to add. The IAF in NC was doing the minimum role of what a proper IAF should do. We hadn't the qualified internal auditors that we could expect value-added from their participation. At the end I would like to add that the ERP system is a very good corporate governance tool; however the internal auditors should be the most involved personnel in utilising these features in the systems to support the governance effort within the company. (IT team member)

7.5 The IAF Adaptation

The ERP system ushered in changes which were cascaded across the entire organisation; therefore, auditors had to adapt as both risks and benefits were propagated in the ERP system implementation. The ERP system could carve a new audit landscape requiring internal auditors to change audit processes, structure, controls and tests when auditing. In order to investigate and explore the response of the IAF to the ERP system implementation in the context of the governance at NC in Egypt, the adaptation of the structure and practice of the IAF were explored after ERP use for 1 year as follows.

7.5.1 Scope of Services and Practice

Before implementing the ERP system at NC, internal auditors emphasised checking and assuring each and every transaction recorded in the financial books irrespective of its materiality and checking various

calculations in the business process and so on. Therefore, internal auditors could not identify and focus on the weak areas of the internal control system of NC. The internal audit scope at NC was determined by the financial management or internal auditors alone based on on-demand audit. When financial management determines the scope, it might exclude problematic areas. When internal auditors determine the scope on their own, the areas selected might be insignificant and the results do not attract attention. Moreover, there was no written authority delegated to auditors. It was assumed that everyone was aware of the extent of the internal auditors' authority. For example, the internal auditor stated that:

> We are working in the private sector so we have to be fixable to please the management. We don't have an approved periodical audit plan. We are getting involved whenever there is a case of deficiencies somewhere in the process. Moreover, the top management believe that having external auditors is enough; therefore the IAF role should be at minimum. The internal auditors do whatever they are asked to do by the management. (Internal auditor)

After the ERP system implementation at NC, internal auditors who traditionally focused on legacy processes realised that controls and processes have shifted from discrete manual interventions to continuous automated monitoring. Integrated processes across business operations made assuring controls onerous, especially when internal auditors were unaware of vulnerabilities which arose during the implementation stage. Moreover, the IAF could not trust and utilise the ERP system unless they are being used correctly. Internal auditors should be confident that all users use it in the right way in order to depend on its outcomes.

After the ERP system implementation at NC, the IAF was reduced from a department to only one internal auditor. This internal auditor has other responsibilities than auditing such as sales targets. There was a belief that the ERP system does most of the internal auditors' duties and that the ERP system reduces to a great extent the need to have internal auditors who verify the correctness of the financial figures or to do compliance auditing with rules. Therefore, the very narrow scope

of the IAF is mostly covered by the ERP system and the value of the traditional IAF quickly disappeared. The ERP system turned the whole financial department into controllers and auditors. There is a peer review process going on. Most of the internal auditing tasks are now done automatically by the systems. There was great emphasis on these changes in the interviews; for example, an IT team member stated:

> The top management kept only one person who is the youngest internal auditor only to show that we still have an IAF; however to be honest he is doing a kind of audit but he has other managerial responsibilities can you imagine!!! (IT team member)

> Some companies have an IAF as a matter of showing. For example, I was surprised when I found in NC that the CIA has other duties he should achieve. This means that there is no understanding at all about what the IAF should be responsible for. These companies keen about having something called IAF but they do not mind what it should do. (The head of the IIA)

NC had an IAF after implementing the ERP system for about one year, but there was no benefit out of this function for reviewing daily operations. The ERP system did more than the internal auditors were previously doing therefore the management though that the external auditing would be enough. The ERP manager stated:

> After the ERP system implementation the internal auditors' role becomes very limited one. The ERP system eroded the internal auditors' role and importance in NC. The business process is going now systematic and almost self-controlled. This means that if we are using the ERP system properly, there will be a minimum need for the IAF. This could be because that we didn't have that strong and effective IAF that do more than transactions review (SAP manager)

> The ERP system does most of the accountants' work within the company and takes us to be reviewers, auditors or controllers to monitor the process going through the systems. (An accountant)

After the ERP system implementation, it was suggested by participants that the internal auditing scope should increase to cover all the new

controls and to utilise the ERP system's controlling features. Internal auditors should be interested in reviewing the access allowed for each employee to the data and the permissions for entering, viewing or editing. Internal auditors should monitor users' activities on the system. These should be the practice of the new IAF; there is no need for technical IT knowledge to carry them out. The ERP system made the IAF easier; therefore, its focus could be shifted to a more strategic role; however, at NC, the IAF disappeared instead of being adapted. Internal auditing efforts should be integrated in the fully integrated working environment. When auditing a single part of the fully integrated business process, this will reduce efforts in auditing all other integrated parts of the process. These suggestions have been raised by most of the participants. For example, IT team member stated:

> We as IT team understand that the IAF should be improved and change to play a modern role on wider scope that means being involved in all functions even IT and IS. …The SAP systems take off huge burden on the internal auditors. Therefore, internal auditors should focus on analysing the data to find improvements opportunities … . The IAF shouldn't be only related to accounting and financial department. (IT team member)

> The ERP system should move their [internal auditors] focus from tiny things to things that matter. The ERP system should be exploited by the internal auditors to increase their scope of focus and to do more analysis to find out improvements opportunities. These systems made the traditional internal auditing very easy and saved most of the time consumed in these regular checks. Internal auditors should decide whether to improve and change their practice to add more value or otherwise the systems offer whatever they traditionally offered. The IAF should be analytical function by the aim of advising and consulting to offer improvement opportunities … The ERP system encourages internal auditors to be involved in new operational areas over all modules such as manufacturing, HR, inventory, purchasing and marketing. The ERP system integrates the whole business process, make all transactions made anywhere in the company reflected in the accounts and help in identifying the deficiencies in the process. Therefore, there should be integration in the auditing missions as well. (Financial manager)

The IAF at NC disappeared; however, most of the participants asserted the need for a developed IAF that could be involved in all processes not only financial audits. The IAF can take advantage of the ERP system implementation to offer recommendations to improve higher importance issues on a higher level than tiny errors and issues.

7.5.2 The Structure of the IAF

At NC, the internal audit team was always looked upon as a representative for the financial department assigned to detect financial frauds. The organisational restructuring after the ERP system implementations was not in favour with the internal auditors.

> The ERP system eliminates the need for traditional auditors who don't know anything except reviewing the documentation process for each transaction. There is a need for more qualified internal auditors, who are willing to accept change and to learn new things. (SAP vendor)

After the ERP system implementation, all internal auditors left NC or were redirected to other jobs except for the youngest auditor. Most of the duties of internal auditors were carried out by the systems, and the others were provided by the IT team. Therefore, it was suggested by participants that experienced IT persons should be utilised. By having a team member with IT knowledge, auditors would be able to increase audit scope. This could be applied to other areas such as operations, accounting, HR, marketing, security and compliance. In order to gain knowledge of all SAP modules, there is a need to have some auditors who have the systems' knowledge related to all modules in addition to the general auditors who have the business process knowledge. To work in the ERP system's integrated working environment, there should be integrated efforts to make the best use of the system. The ERP system offers many control features; however unfortunately, they are not yet used at NC. As was confirmed by most of the participants, the consultant stated that:

> The internal audit team in the SAP systems working environment should contain IT auditors one for each module and one general auditor for the function that the module covers. NC should have certified internal

> auditors and certified information systems auditors. The internal audit team should be integrated in order to be able to perform in the integrated environment. The best is to have an internal audit team that include mixed experiences in all business aspects from purchases, production, marketing, sales, finance, HR, IT, inventory, etc. The IAF should monitor all business aspects with a comprehensive eye. I think that there is a plan at NC to recruit some highly qualified young internal auditors from mixed backgrounds. (SAP implementation consultant)

7.5.3 Internal Auditors Skills

Internal auditors at NC had mainly traditional auditing skills for tracing transactions. These skills were no longer needed. Moreover, internal auditors did not receive proper training that would have helped them to improve their capabilities. It was suggested by participants that internal auditors needed to be trained in technical areas of accounting, auditing, internal control and fraud detection in the new working environment of the ERP-integrated IS. In addition to these skills, there was a need for interaction skills in order to be able to interact with other specialists, with the auditees, the IT team and management. Skills such as business and system knowledge and judgement were needed as well. In order to effectively evaluate risks, assess sufficiency of internal controls and identify improvement opportunities, internal auditors should have a good understanding of the business processes. In the ERP system environment where IT drives key business processes, internal auditors should understand the systems. One of the IT team members stated:

> All internal auditors we had didn't understand how the SAP system can help them in their mission. Internal auditors we had … should be qualified through first understanding the auditing knowledge. Internal auditors should know the modern and comprehensive role of their function. They should forget the traditional transactions tracing. Internal auditors should have continuous education programme in order to be updated with the new development in the function and the impact of the new technology on their function. Internal auditors should be the most trained group on using the ERP system, knowing what are the tools in the SAP that can be used for auditing purposes, knowing how to assure the controls in the system, knowing how to work in a close relationship with the IT team and

> knowing how they can get the reports they need from the system. The internal auditors should be the most interested in the ERP controls and accountability reports produced; however this depends on the organisational culture and the top management understanding of the importance of the IAF role. In NC there isn't the enough appreciation for the IAF; therefore this function couldn't survive in NC after ERP system implementation as it didn't get the proper support to improve. (IT team member)
>
> We need internal auditors, who are able to deal with the system, know how to get the needed information from the system. The SAP systems should be read to learn how is the accounting cycle going through the system, otherwise we can never audit. I believe that to be a good internal auditor, I should be initially a clever accountant. I should know all possible accountants tricks through the systems; therefore I should understand these software details and get full training on these systems. I should get some courses to know how all accountants use the system, how data is entered to the systems and what the outcomes of the system are. Internal auditors should have knowledge more than accountants who are using the systems in order to be able to audit on their outcomes. I have poor SAP and IT and IS auditing knowledge. …I heard from accountants that SAP systems are not easy to be used. I have no idea about the internal controls in the system. (Internal auditor)

ERP implementation exposed some managers such as CIA to becoming unqualified for this position. Auditors needed to learn how and why their processes have changed. These requirements meant that auditors had to change how they thought about their work and how they felt about the new relationships developed within the organisation. Unfortunately, auditors' training in NC was insufficient. The top management should have the willingness to allow adaptation through accepting that a lot of learning has to be done at all levels. This would open up opportunities such as the exchange of ideas with organisations or individuals who have already done successful implementations.

7.5.4 Internal Auditing Tools

The ERP system implementations did not initiate or motivate the use of new audit tools such as electronic work papers, CAATs or query software. The ERP system did not offer functions especially designed

for internal auditing use; however, the ERP system can offer view and query options for internal auditors. The ERP system offers tools which can be used for internal auditing purposes to monitor controls on warehousing, cash management, receivables and payables. The ERP system could make internal auditing easier by offering multi-integrated controls and transparency to trace and the ability for establishing accountability system. The IAF could use the systems to run whatever reports they need; these are integrated and in real time. While the ERP system could be considered as a tool for the IAF to follow up the implementation of governance rules, SAP systems were not being used at all by internal auditors at NC. Evidence was found for this lack of use by internal auditors through the interviews. For example, the internal auditor stated:

> I don't use the SAP system at all even I have heard some of its controlling features. I work lonely in NC as a responsible for everything. I move among headquarter, factories and branches. We will not need new software for auditing as they say that SAP can offer us whatever we need. (Internal auditor)

> Each module offers many types of reports that can be used for auditing purposes. At NC we haven't been asked to make such query responsibilities or to modify any of the reports. (SAP vendor)

7.5.5 The IAF Sourcing

The ERP working environment requires different skills and competencies in the internal audit team. However, at NC where the function is managed internally, the choice of a CIA aims at choosing a harmless person rather than selecting the best. At NC, the traditional IAF was neither outsourced nor adapted. The traditional IAF was eroded; however, there has been a declaration of the need for either an integrated team or to outsource it.

Although NC had no proper IAF, it was suggested by the interviewees that it should have a better IAF that is able to audit in the ERP system environment whether it is internally or outsourced. When outsourcing the IAF to outsiders who have an integrated internal audit

team that contains specialists in all business aspects, then the IAF would be much more effective than having a very poor internal one. This was supported by the ERP system manager who stated:

> The ERP system reduces the importance of having IAF in NC; therefore I see that it will be better to have it outsourced than have it in the company as its role is minimised. Instead of disposing of the IAF totally, we will need it to be outsourced that will be much better. The ERP system needs highly skilled and qualified internal auditors to add value. I suggest that to be outsourced. The external auditors who outsource the IAF have many CAAT that can be used to audit the ERP system from the IT and IS point of view besides the massive data that the ERP system produces. (SAP manager)

7.5.6 Internal Auditors' Relationship with IT Department

After the ERP system implementation , the working relationship between the IT team and the internal auditor became closer. The IT team were always in support of the auditing function, and they always tried to find ways to work around the systems to help internal auditors overcome systems difficulties. Since NC had a very weak IAF, the IT team started supporting management needs through monitoring the activities on the systems, assuring the segregation of duties and assuring the correctness of the financial numbers. The IT team were involved in the ERP system implementation and participated in the segregation of duties rules setting. IT team members at NC have accounting backgrounds and understand the SAP systems; therefore, they did some of the duties that were supposed to be done by internal auditors. The IT team understood the audit logic and started providing some audit services to the top management. This was one of the main factors that led the internal audit team to leave NC. Therefore, the IT team gained importance more than the financial team. Therefore, having IT auditors in the audit team to audit the IT department's activities was recommended. Previously, the financial team was the most important team in NC as they have the right to confidential information. Now, the IT

team is very important too as the CFO and the IT director became on the same level or more of importance within NC. As the information was available at the financial department, it was available in more detail and more clearly to the IT department. It was observed by the researchers that the internal auditor is located within the IT department. Many supported this theme; for example, the IT team member stated that:

> I monitor the financial module performance and reviewing most of accounts on regular basis. I have accounting background and was involved in the SAP implementation and I fully understand the whole financial process through the system from A to Z. I report to the top management about the users activities on the system. We don't have an actual IAF therefore we are managing, monitoring and assuring issues. There should be collaboration among IT team, IT auditors coming from technical background, financial auditors coming from accounting background and general auditors having business process knowledge. IT team can enhance the IT auditors' capabilities but when we have them (IT team member)

7.5.7 The Size of the Internal Audit Team

The IAF has been eroded after the ERP system implementation for many reasons. These reasons include: the IAF maintained a very traditional auditing mindset that did not add value and was easily covered by the ERP system; internal auditors did not participate in the ERP system implementation to know how the ERP system would affect their work; there was no clear change management plan that included IAF adaptation; there was no interest or support from the management for adapting the IAF; the ERP system made the need to have a traditional IAF obsolete and the IT team took over many auditing duties. Therefore, internal auditors could not cope with the new working environment and preferred to move to another company except only one internal auditor who did the physical count and worked in between the financial department and the IT department. Moreover, the ERP system made the traditional internal audit practice, which was the main activity of the IAF, very easy compared to before. Therefore, there was agreement

about reducing the IAF size after the ERP system implementation. NC shrank the internal audit's traditional team as the ERP system offered well-controlled business processes. Most of the internal auditors at NC had the skills to audit on paper and did not know how to use computers. This depletion of the internal audit has been confirmed by many, and the internal auditor stated:

> We had full audit department but unfortunately it isn't exist anymore. The head of the internal audit department left the company and then disruption in the department occurred, therefore most of the auditors left too. The internal audit department is empty these days; therefore it needs to be rebuilt again not change. It should be rebuilt according to the new needs of working in integrated environment. (Internal auditor)

7.5.8 The IAF Budget

At NC after the ERP system implementation, the budget assigned to the IAF has decreased significantly as the team was reduced from nine to only one. Moreover, the ERP system reduced the cost of audit investigations because of improved visibility. The integration offered by the ERP system gives the internal audit the possibility to perform many tasks without moving from the office. By saving the time and effort of the internal auditor, the money spent on the function was reduced. NC saved on the budget assigned before for the IAF. The budget assigned to the IAF reflected the interest of the top management in supporting this function. The top management at NC did not give proper support for this function. While the budget was reduced, participants suggested the need to increase it in order to add more qualified internal auditors with mixed experience and to use the new audit tools. For example, the internal audit stated that:

> SAP systems saved the visiting expenses to the branches as SAP offer transparency of financial information and visibility of non-financial numbers. Therefore, the IAF investigation expenses decreased; however with the need for qualified a mixed team and the need for IT audit tools the budget assigned for the function should increase. More training and better tools are needed. (Internal auditor)

7.5.9 Internal Auditors' Relationship with the External Auditor

The ERP system implementation did not affect the working relationship between internal and external auditors as it was very weak both before and after ERP implementation. External auditors had doubts about the independence, objectivity, expertise, scope of work, size of the audit department and overall effectiveness of the IAF at NC. They felt that the IAF lacked professionalism, which adversely affected its work and the level of cooperation between them. NC had an IAF consisting of only one person who lacked qualifications with a scope of duties which is not clearly defined and did not report to the audit committee. Although ERP systems implementation did not change the working relationship between internal and external auditors, it helped the external auditors in their work. For example, the external auditor stated that:

> In the most of national companies such as NC the IAF is under the supervision of the financial manager. This undoubtedly affects the internal audit independency. The IAF at NC does not add value as it is not independent and internal auditor is involved in daily non-audit related work. ERP system didn't change the relationship with the internal auditors; however it helps external auditors in their work of testing of controls. (External auditor)

7.5.10 The IAF Strategic Response

The ERP system was a proximate trigger of internal auditing change, but change processes were triggered ultimately by NC's management and auditors. Since the context was highly uncertain for internal auditors, they exerted effort to reestablish control through trying to imitate legitimacy features of successful models. However, they could not find any suitable models because of the weak internal auditing professional networks available. The auditors' uncertainty was exacerbated by the limited information provided to them about the organisational changes. The centralisation, automation and integration of data processes brought

with the SAP implementation caused a reduction in the IAF content, reduction of the number of auditors and resulted in a loss of autonomy for the IAF as it became very close to the IT team.

Internal auditors could not use the compromise strategy actively through bargaining tactic. Internal auditors did not participate in the ERP system implementation. However, it has been used through balancing tactic. NC did not discard all internal auditors; however, it kept an internal auditor as a sign of having an IAF. In this respect, most of the interviewees stated that:

> The views of the internal auditors were not considered and therefore their knowledge, experience, requirements were not incorporated. (IT team member) The new system was imposed without considering our views. (Internal auditor) I think if they participated in this stage, this could give them huge experience about the business process through the systems and offer them the opportunity to put forward their requirements and preferences. (SAP implementation consultant)

Internal auditors tried to use a defiance strategy; however, their efforts could not succeed because using defiance strategy involves direct and open challenging or attacking the ERP system implementation as a source of pressures. Through *dismissing tactics,* internal auditors tried to resist the ERP system usage. The interviewees noted that the resistance to the change was more visible in the internal audit department collectively rather than in individual auditors. Furthermore, resistance was higher among older than younger auditors. For example, one of the IT team who was involved in the ERP system implementation comments:

> The youngest internal auditor was very interested in knowing more about the system. He was coming to us asking many questions about the systems and how it will affect the function. Other older internal auditors avoided and ignored the systems and started looking for other jobs in other companies without dealing with the systems. (IT team member)

The resistance to change was mainly demonstrated through absenteeism at the training sessions and at the presentations about the SAP and also

through the refusal to use the systems. For example, one of the IT team members stated that:

> The IAF wasn't that strong function to do effective resistance. The Internal auditors believed that they will be neither able to change the implementation nor improve their function to add value in the new working environment. (IT team member)

> The internal auditors in NC refused to understand how these systems work and how they can use it in their audit. Internal auditors couldn't deal with the systems. (The ERP manger)

Through challenging tactics, there was an unsuccessful attempt at resistance. Internal auditors raised the lack of trust in the system by many users. They doubted that the systems will give the accurate and anticipated results that they were spending nights to get right manually and to assure the accuracy of the results. They refused to learn how to extract the data directly from the systems. They claimed that data should be provided for them on demand and refused to learn how to access it themselves. The internal auditors raised the issue of the increased transparency that the ERP system offers and pointed out that it was not preferred by the management. There was no encouragement to increase the transparency at NC, while the ERP system intrinsically tends to increase transparency. However, the auditors' challenge was ineffective as management eventually went ahead with the implementation of the systems. The last option for internal auditors was to attack the systems. They voiced their unhappiness but since they had a very vague understanding of what these systems could offer all they could do was to say that they would not use these systems and raise general concerns about all of the users' fears of these complex systems.

Internal auditors used an avoidance strategy through tactics of buffering and escaping. The IAF responded through avoiding the pressure to change. At NC, internal audit staff realised the inevitability of change to their current practice and their fears grew steadily. Through a buffering tactic, internal auditors tried to keep their old way of reviewing

manually using paper-based methods because of their lack of trust in the new system. The internal auditor commented that:

> Now I depend on my own auditing experience to find out errors such as data entered to the system twice. I depend on my experiences and I don't fully trust the ERP system. Technological systems' results might be right or wrong, while when I do everything by my hand and eyes I will be confident in the results 100%. Moreover, the data entry people are not that qualified, therefore I expect more errors. (Internal auditor)

Errors in the ERP system, such as data duplication, data loss and errors in codes assigned to the data which happened in the first few months of the system use, reinforced the concerns of the internal auditors. However, the problems were gradually resolved by the IT team and the consultant.

Using an *escape tactic*, when the workload allocation was completed and internal auditors faced new responsibilities, they terminated. Internal auditors avoided pressures by changing their activities, thus escaping from the domain where the pressures were exerted. The auditors opposed the SAP systems and left NC because the integrated systems created redundancies and relocations. The IAF had nine auditors at the time of ERP implementation, some auditors were made redundant, others were moved to other departments, others opted for voluntary resignation, and the only one left was reallocated to do more than auditing. For example, one of the IT team members commented:

> Ninety present simply couldn't cope with the new working environment and the management didn't give them opportunity and decided that there is no need for this function. Most of them find themselves other jobs in other companies. (IT team member)

> The internal auditors we had couldn't cope with the new working environment and the management found that there is no added value from keeping this function. (SAP implementation consultant)

Among the main reasons that pushed the internal auditors to escape and avoid using the systems was the lack of support from the top

management. Internal auditors did not receive the proper training to understand the systems. They did not get involved in the implementation process. There was a common theme in the internal audit department that this department will disappear after the ERP system introduction. The IAF effectiveness was an important variable in internal auditors' responses to the logic of the ERP system. As the IAF was very inefficient before the ERP system implementation and there were very weak pressures on the top management to maintain a sound IAF, the IAF could not adapt to accept, understand and change to utilise the new logic of control the business brought with the ERP system. This occurred by making it appear that NC had an IAF and good procedures in response to new requirements, but, in reality, they dismissed this function. NC maintained the appearances of institutionalised practice and structures as the IAF can be considered as a legitimacy producing.

7.6 IAF Legitimacy After ERP Implementation

While the institutionalisation process of the ERP system continued to gain momentum, the IAF has been challenged and no new practice and structure have gained legitimacy. The ERP system was considered as a potential threat to the IAF's legitimacy. The ERP system's logic of control of the business was visible and articulated, while areas of IAF adaptation, within a context of organisational uncertainty that did not provide adequate direction for the change, were pursued. According to Oliver (1991), acquiescence strategy is invoked when the need for legitimacy is high and there is significant uncertainty. Acquiescence could be a way of gaining control and stability in an unpredictable ERP environment and also a way of maintaining or gaining social legitimacy; however, the IAF at NC could not apply this strategy as there was no need for NC to legitimate itself through having a sound IAF. Another dimension of external legitimisation on the organisational level was to maintain the legitimacy for NC by decoupling the inner core from external environment. This is the way that NC used as there was no actual IAF; however, one internal auditor was kept as a symbol of having an IAF.

Depending on isomorphism might be important for legitimacy; however, one of the reasons for not applying this strategy was the lack of successful and legitimate IAF models in the ERP system environment which could be applied. The IAF was not fully considered as a profession. Normative pressures involved the professionalisation of the internal auditors who aspire to define the conditions and methods of their work so as to legitimate their professional autonomy. Here, expectations of acceptable practice were presumed to exist and the IAF conforms to them to gain legitimacy. However, there was a lack of active IIA by which these expectations could be constructed, enforced and changed. The IAF has undergone significant changes in its beliefs, roles and logics that legitimate its practice; therefore, traditional auditing skills appeared to become partially obsolete in legitimating the profession as was traditionally held. However, internal auditors at NC stuck to the old concept of auditing claiming that this gave them legitimacy; however, they had clearly lost their legitimacy.

According to institutional theory, the professions in particular tend to gain legitimacy by affiliating their efforts with the social values of rationality, efficiency and science (Abbott 1988). As internal auditors at NC considered their role to serve their managerial clients rather than others, this affected what they regarded as legitimate. Recognition of the profit motive in NC made them not preoccupied with issues of the IAF professional legitimacy. According to Oliver, the compromise strategy would be invoked when there existed significant uncertainty, but without a pressing need to maintain or gain legitimacy. Therefore, NC has used this strategy. Oliver did not explicitly consider the possibility of invoking multiple strategies in the face of a highly fragmented environment.

It was suggested that the basic strategy to improve legitimacy should be to obtain appropriate credentials that support the auditors' claim to esoteric knowledge. This would be by initially passing the examination administered by the IIA and by the ISACA. Second, legitimating through develops a professional knowledge base, an integrated team and a repertoire of skills that are specific to serving the organisation in the ERP working environment. According to the modern definition of the IAF by the IIA, the IAF should be legitimate through being able to assure the internal controls and ability to assess risks; however, the IAF at NC failed to preserve this role and therefore it lost its legitimacy.

7.6.1 Ability of the IAF to Provide Control Assurance

The ERP system could not be separated from the business as it is another resource including people and assets which are used to achieve business objectives. Therefore, IT controls were as important as any other controls in the business. At NC, the IAF could not assure the effectiveness of internal controls after most of the internal controls they used to review became automated by the ERP system. However, if the internal auditors assure the implementation of the segregation of duties rules on the systems and assure that all the feed processes are done correctly, then the internal auditors could give partial assurance about the effectiveness of the internal control system. The early involvement of the internal auditors in setting up various controls in the ERP system could generate substantial savings in the subsequent control appraisal. The IAF could engage in proactive auditing and work jointly with other experts to implement change and set up control systems.

7.6.2 The IAF Ability to Support Risk Management

The ERP system brought some technical risks that the internal auditors did not know how to assess, such as the risk of business process continuity when the systems go down. Moreover, there was a risk of centralisation by having all information in one place. If any unauthorised person accessed this information, then the company would be at risk. The IT team were responsible for assessing and managing these risks, and internal auditors had no role to play in this issue. For example, one of the IT team members stated that:

> The ERP system brings IT risks of system being down. Once the systems stop the whole business processes stop. There are mitigation solutions such as mirroring through having two servers one backup. IT team is the responsible for assessing and managing these risks without any participation from the IAF. (IT team member)

However, the ERP system offered new assumptions to improve business control; at the same time, it brought new risks. Internal auditors should

understand how to use the ERP system to assure better internal control and mitigate all risks.

7.6.3 IAF Importance After Implementing ERP

At NC, the top management did not attach importance to the IAF. The infrastructure for conducting internal audits was inadequate as no follow-up actions were taken. Apparently, no stakeholders were interested in knowing the deficiencies in the IAF. The IAF did not preserve its importance in NC; otherwise, it would not be so easy to cancel its existence. Internal auditors did not understand all security aspects in the SAP systems; however, it was very important for them to have this knowledge. If the internal auditors had the systems knowledge, their position and their price in the market might increase.

There was no coercive pressure as the IAF did not have any statutory recognition because there was no specific provision in the Companies Act that gives power to the stakeholders to enquire about the internal audit reports and take any action against the management, if the management fails to ensure proper IAF. The normative concepts regarding the IAF had a negative impact in guiding the IAF adaptation after the ERP system implementation. There was no ethical code and disciplinary mechanism that applies to internal auditors. Therefore, most internal auditors were convinced that their main role is to look for deviation from the policies and to write notes about these issues. This is a serious reputation issue that the IAF must address. Internal auditors must eliminate such negative perceptions to be effective in their activities. Ignoring such perceptions reduced the legitimacy of the IAF in its activities and with stakeholders.

7.7 Case Study 2—Conclusion

Normative values and norms supported the traditional view of the IAF. This had a negative impact on the IAF adaptation after the ERP system introduction and did not work to legitimise it. The absence of cultural-cognitive pressures of governance regarding the IAF resulted in shared

misconceptions that constitute the social reality about the accepted weak role of the IAF. Mimetic behaviour explains the common theme that the internal audit is not an important function. The wider belief systems about the accepted traditional auditing were adopted by IAFs to deal with uncertainty after the ERP system implementation; therefore, at NC there was no clear successful model for the IAF to follow.

NC had chaotic business process, which became organised with better controls from the ERP system implementation. The ERP system has made many of the internal auditing practice redundant. The ERP system increased the inter-dependability of work processes and increased the importance of peer reviewing. With the ERP system, control became the responsibility of everyone.

The ERP system collided with management philosophy, and the practice at NC was not in alignment with proper governance. The top management did not accept the transparency and standardisation offered by the ERP system. The ERP system implementation involved shifting from a rule-breaking, flexible and individualist culture to a standardised and integrated way of doing business. However, the required changes were not made clear at NC, nor were the rationale for these changes communicated. The organisational structure changes brought with the ERP system implementation reduced the importance of the IAF as there was no change management plan. NC arranged some ways to work around in order to keep the preferred practice.

The IAF was reduced from a department to only one internal auditor, who has other responsibilities than auditing such as sales targets. The very narrow scope of the IAF was mostly covered by the ERP system, and the value of the traditional IAF disappeared instead of being adapted. Internal auditors did not receive proper training to improve their capabilities; therefore, all internal auditors left NC or changed to other jobs except the youngest one. The traditional IAF neither outsourced nor adapted but eroded; however, there is a declaration of the need for either an integrated team or to outsource the function. The IT team started providing some audit services, and this was one of the main factors that led the internal audit team being eroded.

Since the context was highly uncertain for internal auditors, they exerted efforts to reestablish control through trying to imitate legitimating behaviour from successful models. However, they could not find

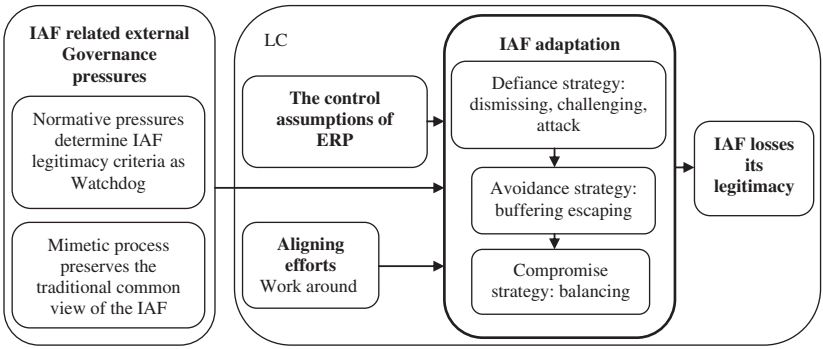
IAF related external Governance pressures
Normative pressures determine IAF legitimacy criteria as Watchdog
Mimetic process preserves the traditional common view of the IAF
LC
The control assumptions of ERP
Aligning efforts
Work around
IAF adaptation
Defiance strategy: dismissing, challenging, attack
Avoidance strategy: buffering escaping
Compromise strategy: balancing
IAF losses its legitimacy

Fig. 7.1 Case study 2—summary of the main findings

any because of the weak internal auditing professional networks available. A compromise strategy was invoked through balancing tactics because of uncertainty, but without a pressing need to maintain legitimacy. Internal auditors tried to use the defiance strategy through dismissing, challenging and attacking tactics; however, their efforts could not succeed. Internal auditors used the avoidance strategy through tactics of buffering and escaping. IAF at NC could not apply acquiescence strategy as there was no great need for NC to legitimate itself through having an adapted IAF. Internal auditors at NC stuck to the old concept of auditing claiming that this gives them legitimacy; however, they clearly lost their legitimacy. These findings are summarised in Fig. 7.1.

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8

Findings from Case Study 3—National Bank (NB)

8.1 Background and Overview

NB is one of the largest state-owned banks in Egypt. It was founded in 1920 with the aim of investing national savings and directing them towards economic and social development. This bank established 26 companies in various economic fields, including spinning and weaving, transport, aviation and cinema. The bank has more than 470 local branches, together with an international presence in France, Germany, Lebanon and the United Arab Emirates, in addition to its worldwide network of correspondents. The bank is a pioneering bank in utilising state-of-the-art technology for banking systems and services in Egypt. It has a computing centre, which is one of the largest in the Middle East, connecting most of its branches with a computer network that extends to most branches in Egypt. It is the first bank in Egypt and North Africa to become compliant with the Payment Card Industry (PCI) data security standards, utilising the latest technology in the banking sector.

As a part of the banking sector development scheme in Egypt, the control concepts and procedures were changed. Therefore, the bank has

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implemented Oracle (e-business suite) the ERP system in 2010 to control all transactions that run out of the core-banking system, which was FLEXCUBE. Oracle FLEXCUBE centralised the bank operations platform and enabled the bank to achieve optimal operational effectiveness through standardised processes and centralised controls. The implementation decision of these systems has been suggested by the central bank of Egypt. The central bank of Egypt considered these systems to be successful tools, which have been implemented all over the world in many banks. The ERP system was implemented with the aim of improving the internal control system in the back-office operations of the bank. The bank implemented financial accounting, inventory and purchasing and human resources modules. One main reason for implementing the financial module was to take out all fixed assets, receivables and payables transactions from the core-banking system to make it for clients' transactions only. The ERP system served as back-office systems that integrated with the core-banking front-office systems. Final financial statements could be prepared by the ERP system.

A total of 15 interviews plus one focus group with the stakeholders were conducted, and all related documents and observations were analysed as summarised in Table 8.1.

8.2 IAF-Related Governance External Pressures

In the early 1990s, an economic reform programme was pursued in Egypt, led by the World Bank, International Monetary Fund and other institutions, with financial sector reform at the heart of the programme. In the most recent phase of reforms, the central bank of Egypt has modernised the institutional framework for faster processing of transactions among banks through introducing real-time settlement and an automated clearing house. The governance framework for banks has been significantly upgraded, especially at the four large state-owned banks in Egypt. Lack of adequate internal controls was a main factor for allowing fraud. Lack of management review and the ability to override controls opens the way for corruption. These were typical elements of governance improvement efforts. The success of bank governance was not only depending on laying out controlling rules, but also on its sound

Table 8.1 NB interviewees and other sources of evidence

The positions of the interviewees
Chief internal auditor (CIA)
Oracle project manager
Oracle HR module manager
Head of the IT department
IT consultant participated in the ERP system implementation
IT external auditors focus group
Oracle purchasing module manager
Oracle financial module manager
Senior financial internal auditor
Oracle inventory module manager
A controller of the central bank of Egypt
Senior external auditor of the bank
External auditor of the bank
Oracle system vendor
Oracle support team member
Head of the IIA chapter in Egypt
Sample of documents: Egyptian corporate governance code, the Banking Sector and Money Law (No. 88/2003), the Central Auditing Agency Law (No. 144/1988), Accounting Practice Law (No. 133/1951), archival documents, internal memos, internal audit reports, external audit reports, internal job descriptions, business instruction manuals, instruction manuals, Oracle materials, informal conversations, the regulations of the central bank of Egypt and consultancy reports
Sample of observations: Relationship between the IAF and other departments, arrangement of the internal audit department, the IAF use of computers and automated tools, the availability of internal audit job descriptions and manuals

implementation. This depended on the surveillance of the central bank of Egypt and on the administration of the bank concerned.

Governance institutional pressures are elaborated in terms of social forces that impose certain pressures to develop a particular practice (DiMaggio and Powell 1991). These pressures stem from the state, the auditing profession and the process of adopting certain successful practice.

8.2.1 IAF-Related Coercive Pressures

Reviewing the laws related to the banking sector such as the Banking Sector and Money Law (No. 88/2003), the Central Auditing Agency Law (No. 144/1988), Accounting Practice Law (No. 133/1951) showed

that the legal framework that regulates governance rules and auditing practice in the Egyptian banking sector has no rules directly related to the IAF. The Banking Sector and Money Law (No. 88/2003), article 43, states that "the governor of the central bank shall be consulted on the appointment of the executive directors in charge of internal inspection". The executive regulations of the banking law (No. 203/1991/2004) stated at article no. 5 that "banks shall submit an application for registration to the Central Bank accompanied by documents that include names of and data about the executive directors of internal inspection". This means that there is no pressure to have an IAF; however, there is an emphasis on having internal inspection department. This means keeping the very traditional concept of having an inspection function that is compliance oriented and only provides a report on its findings.

Banks are required by law (No. 203/1991) to have audit committee of non-executives. According to the executive regulations of this law 2004 at article 27, the audit committee formed in each bank shall have the following functions:

> Discuss whatever issues the committee may consider with the internal inspection director and the compliance officer at the bank; Coordinate between the tasks of internal and external auditing and ensure that there are no hindrances in communication between the internal inspection director and the external auditors on the one hand and the board of directors and the auditing committee on the other; Review and approve the annual internal auditing plan; Review the reports prepared by the internal inspection department, including the reports on the adequacy of the bank's internal control systems and the extent of compliance therewith, in addition to following up on the recommendations of this department and the response of the bank's management thereto; Study the obstacles facing the process of internal auditing or the work of the compliance officer and propose the adequate means for the elimination of these obstacles; Review the report of the bank's internal inspection department on the adequacy of qualified staff at this department, the qualification level of the compliance officer at the bank, as well as the level of training and qualification of the staff.

This indirectly means that the internal inspection department prepares reports on the adequacy of the bank's internal control systems , the

extent of compliance therewith and on the adequacy of qualified staff at this department. However, it is clear that banking law did not mention the IAF in any article; however, it mentioned that banks should name the executive directors of an internal inspection. The law did not clarify what are the duties, roles, practice or structure of the internal audit or inspection department. On the other hand, while the executive regulations of the banking law mention the duties of the audit committee, it did not clarify what is the difference between the internal audit and internal inspection. These terms have been used to have the same meaning; however, there is a great deal of confusion at NB between them. The mixture of using both terms in the executive regulations of the banking law causes confusion. Moreover, the internal audit or inspection did not get the proper support from the law as the internal inspection director has no vote when attending the audit committee meetings. The mandate of the IAF was not stated through a formal charter, but stated implicitly. Internal inspection and the IAF have two distinct roles. They become confused when there is no real understanding about each different role and when regulators do not understand the different roles.

Regarding the supervisory bodies, the central bank of Egypt is the authorised supervisory body of the banking sector. The central bank of Egypt has the legal power to supervise and to take corrective action against banks not in compliance. However, bank supervision in Egypt was hampered by limitations. The significant increase in the number of banks and branches has not been met by an equivalent increase in the staff, capacity or resources of the central bank of Egypt's control department, resulting in insufficient on-site monitoring. The central bank of Egypt did not give attention to the findings of an internal audit report. This was confirmed by many in the interviews, for example:

> We don't review any internal audit reports. The IAF within banks is working to prevent the bank any penalties could be given based on the inspection done by the inspectors of the central bank of Egypt. There is no cooperation at all as they try to hide or fix any deficiencies found before being found by the inspectors of the CBE. (A controller of the central bank of Egypt)

In November 2002, the central bank of Egypt issued a manual about the control policies that should be followed by all banks. In the third

part of Chap. 2, there was a definition of the duties of the audit committee that included:

> Provide communication channels with internal auditors; Review the recruitment, changing or resigning the director of the internal audit; Review the internal auditors' independence; Collaborate with the director of the internal audit and with the external audit to: Arrange between internal and external auditing duties to integrate their efforts, Review the sufficiency of internal controls including the computerised IS controls; Review the following with the internal auditors: The important notes resulted from internal auditing and the procedures to address these notes, The obstacles faced the process of internal auditing and the limitations of accessing the data, Changes needed in the internal audit plan and the availability of the qualified personnel in the internal audit department.

It is clear that the central bank of Egypt uses internal auditing instead of internal inspection, which means a shift in focus. Although there is still nothing related directly to the execution of the IAF, the importance of this function started to gain more attention.

In 2011, the central bank of Egypt issued an internal audit charter and an internal auditors' code of ethics and clarified that the source is the IIA. The charter described the mission, authority, responsibilities and standards of the internal audit inside the central bank of Egypt. The code of ethics outlines the ethical principles and rules of conduct for the internal auditors at the central bank of Egypt. These are neither compulsory to be followed by banks in Egypt nor even work as guidelines for banks in Egypt.

To conclude, the legal framework for the Egyptian banking sector has no rules devoted especially to the IAF; however, it has been mentioned indirectly through determining the audit committee's responsibilities. Moreover, there was confusion in using the terms "internal inspection" and "internal audit". This establishes the concept of being inspectors, detectors or policemen who are compliance orientated only; however, one of the audit committee duties is to review the reports prepared by the internal inspection department, including the reports on the adequacy of the bank's internal control systems and the extent of compliance. This means indirectly that the internal inspection department is

responsible for assessing the adequacy of the internal control systems and compliance. Although in 2002 the language of the central bank of Egypt spoke only about the internal audit, practitioners at NB still consider themselves as inspectors and it was observed by the researchers that the labels on all offices and desks in the department said "inspector". Moreover, the assurance of the sufficiency of internal controls including the computerised IS's controls is not the responsibility of the IAF alone. It is the collective responsibility of the audit committee, the internal audit and the external audit.

8.2.2 IAF-Related Normative Pressures

The Egyptian Society of Accountants and Auditors (ESAA) is recognised as the association of chartered accountants and auditors that develops the educational and professional standards in Egypt. The ESAA selects the international standards applicable to the Egyptian situation and translates them into Arabic language. Egyptian auditing standards dealt only with the reporting issues and ignored the other areas of international standards on internal auditing. However, the international standards on auditing are applied in the absence of Egyptian standards on auditing, as stated in the introduction of the Egyptian standards on auditing. The ESAA does not ensure compliance with rules of professional conduct.

From auditing education side, auditing educational quality suffers from a lack of a modern syllabus and funds for training. The lecturer/student ratio in accounting and auditing departments of public universities is about 1–1000, which hinders good educational process. Auditing courses focus on basic topics and do not include international standards. Although private universities introduce high-quality auditing education using an international English syllabus, the extremely high tuition fees are restrictive.

To conclude within the context of NB, normative pressures have a negative impact on improving the IAF. This is based on the weak professional and educational environment. Although there is a professional body for accounting and auditing in Egypt, it was not concerned with the internal auditing profession. The IIA chapter in Egypt depends on

personal relationships to the support the profession and increase society's awareness of this function.

8.2.3 IAF-Related Mimetic Pressure

Because of the lack of determination of the IAF within NB, there was a tendency to stick with the traditional concept of inspecting to prevent penalties arising from central bank of Egypt inspection. Being an inspector is an accepted role of the IAF as in the central bank of Egypt. The mimetic pressures encouraged internal auditors in NB to be attached to the traditional internal audit role as the inspection function that looks for errors. The head of the IIA chapter confirmed:

> The working environment of the IAF within NC is characterised by uncertainty. There are not clear written objectives, working manuals, plans, strategies for improvement, job description, transparency or reward and punishment rules… Moreover, they do not give the IAF the proper weight or support. They are maintaining the traditional view of the IAF as an inspection function. (Head of the IIA chapter in Egypt)

8.3 Control Assumptions of ERP

The ERP system was considered as an important part of the technological infrastructure for accounting and control systems in NB as control and IS were inseparable. The ERP system was a back-office system in NB; therefore, it did not affect the internal controls on client transactions in real time. The ERP system enhanced the internal controls on all levels of NB, especially on the headquarters level over HR, inventory, assets and purchasing transactions. The ERP system receives and integrates financial data related to clients from the core-banking system with all financial data related to bank transactions as normal corporate procedure. Before implementing the ERP system at NB, it was very difficult to control the purchasing and inventory transactions over more than 400 branches based on manual and legacy systems. The Oracle vendor stated:

> For NB that has more than 12,000 employees, it was very difficult to manage these employees without the ERP system… All related processes were done manually but become automated and integrated by implementing the ERP system. Therefore, the ERP system helps to control costs and reduce human errors. (Oracle system vendor)

The ERP offered a powerful and effective control environment that is flexible regarding the available controlling options. The study found that many risks have been reduced by implementing these systems as they offer strict control principles through the following assumptions as confirmed by most of the interviewees.

8.3.1 Automation

NB has a large number of branches and employees; therefore, one of the main motivations for implementing the ERP system was to automate the back-office processes that had been done manually. The ERP system controls the business based on automatic controls such as automatic profiles, application access and automatically check, direct, process and verify data. Automation results in assuring data privacy, controlling data access, reducing human intervention, reducing errors and increasing internal control effectiveness. These controls were enforced within the e-business suite. A control setting could be verified automatically through a named function. The ERP system controlled the entire payroll processes automatically through preventing human intervention and automatic calculation of the salaries and deductions. This was confirmed by most of interviewees, for example:

> By choosing Submit for Approval, documents that require approval of someone else's are automatically submitted to that person for approval, based on approval hierarchy setup. Automatic submission check verifies that all mandatory fields have been entered and that all data are within prescribed ranges. Documents fail any of the submission check rules, systems automatically move to the approval errors window where you can review it. The document is automatically printed once it is approved. All accounting entries related to this process are recorded automatically

> and directed to the relevant accounts without any manual intervention. (Oracle purchasing module manager)

As the accuracy and availability of information were at a low level, the importance of having automated and documented processes increased. The change in the control and moving to an automated working environment has an impact on the work of the IAF at NB. Most of the interviewees supported this point of view as a senior internal auditor stated:

> We as internal auditors and the financial department faced huge change in our practice and get stressed. Now all accounting records are done automatically. There isn't any reconciliation entry to be done manually. Full financial statements can be fully prepared automatically. (Senior financial internal auditor)

> The automation level in NB was low. Therefore, when the ERP system was implemented, NB was not keen about how much the process is improved, but about having documented processes and available information. (Oracle system vendor)

8.3.2 Centralisation

The ERP system uses large centralised databases that collect and store data from different systems and which is related to a variety of types of transactions and then make the updated data available to all sectors of NB in real time. This process minimises data redundancy and the divergence in values from one system to another when using the same data. The Oracle ERP system provided features to enable central data consolidation of similar functions across all branches. This consolidation is typically based on centralisation. This centralisation can be considered as one of the ERP system's assumptions to centrally control inventory, HR, purchasing and assets in branches from headquarters.

> The ERP system allows a bank-wide centralisation of all transactions and provides an immediate status report. The ERP system uses a single central source of information throughout the business, controlled by a set of modules designed to streamline business processes. Access control moved

> to the ERP system where security rules were defined and centrally maintained. (Oracle financial module manager)

Centralisation improved the internal control system through making data related to the transactions in all branches available. The ERP system constrained the centralised control via the NB headquarters. The greater centralisation afforded by the ERP enhanced the internal control structure through more integration and visibility. All information is centralised in a single database that is accessible through all modules. Therefore, the ERP system offered a good opportunity to consistently provide information to controllers in a centralised manner. This opened the possibility of a deeper level of controllability for activities that had been partially opaque. The ERP system allowed better internal information control since information details about economic and non-economic business transactions are tracked in a centralised database.

8.3.3 Continuous Timely Monitoring

While legacy AIS were recording and processing transactions with a significant time lag, the ERP system has enhanced timely data processing to achieve real-time control. ERP systems improved the control system based on offering the ability to continuously monitor users' activities and information. The monitoring controls include controls over user access, segregation of duties, operations, IT and compliance. The ERP system not only integrates information from different areas, but also provides real-time communication and collaboration for control purposes. The ERP system offers a tighter internal control structure through providing a wide range of reports that can help in continuously monitoring users' unusual activities and in improving communication between different levels; however, it appears that this option is not used by the internal auditors. This was confirmed by most of the interviewees such as the Oracle vendor, who said:

> Continuous monitoring features are available in the ERP system; however nobody asked about activating these reports or access… Internal auditors didn't know or interest about even knowing what is the continuous auditing or how it can be implemented. (Oracle system vendor)

Internal auditors believed that the most important improvement from the ERP system is that they depend on updated information that is continuously monitored by the systems. The ERP system gave the ability to update all records in the database in real time just by entering data into the systems. This was a surprise to auditors who were struggling to get the data. This new ease of access to data was confirmed in the interviews; for example, a senior internal auditor stated:

> Implementing an Oracle ERP…has enabled auditors to easy analyse and response to management needs through timely reporting. As the ERP system offers access to up-to-date data, therefore audit process has been facilitated. With The ERP system, financial data are more accurate through which trial balances and other financial reports are available instantly and provide real-time visibility into the bank's finances… With ERP in place, auditors have access to a number of reports and forecasts that allows them to use accurate and real-time information for internal control purposes. (Senior financial internal auditor)

This confirms the theme that working previously in an environment, where it was very hard to get the needed information to do the required job, changed the whole focus of the task just by having the basic accurate information. Having accurate, consistent and updated information was a huge enhancement for the IAF at NB. Therefore, it is understandable that internal auditors did not require more reports than the standard offered by systems, since the information offered satisfied their expectations and more.

8.3.4 Data Consistency

The integration and standardisation of business process resulted in all data being consistent among all branches. The ERP made it possible to gather financial accounting data in a standardised format from all branches and to provide reports that are comparable between branches. The ERP system supports the IAF role in the internal control over financial reporting through providing access to consistent data in an easy manner. For example, regarding the inventory and purchasing process, the availability of consistent data related to 500 branches

is considered as an important point in controlling all branches centrally from headquarters.

> Before implementing the ERP system, when the internal audit department asked for a report about the overall status of the bank, we were sending each manager of the 14 branch groups' managers to provide us with their branches status. Then, we spend long time to make it relatively consistent and in one report… It was very difficult to get accurate and consistent data that help in tracing a process in order to know the responsible for any error or fraud. After implementing the ERP system, it is very easy to access any needed information in a consistent manner without depending on individuals' responses that were always very late and puzzling. (Oracle inventory module manager)

8.3.5 Data Security

Considering data security as a component of the internal control system was a new concept for internal auditors. The ERP system includes function and data security as well as role-based access control. The role-based access control model is based on function security and data security models. Function security restricted user access to individual menus of functions within an application; however, some functions in it may not be appropriate for each user. Therefore, data security provided additional access control on data.

> One of the most important advantages of ERP is its computer security. Data is more secure, because instead of all the data being spread throughout the bank, it is now housed in one place. The bank is also protected from many types of industrial espionage and embezzlement that can grant savings and risk mitigation. Employees are only able to see information that pertains to their jobs, which helps to eliminate data tampering and other crimes of collusion. (Senior financial internal auditor)

8.3.6 Integration

NB was using legacy distributed systems that were not integrated. In each branch, there was a stand-alone server; therefore, a huge effort was needed

to consolidate information about the whole bank. NB implemented ERP as back-office systems and integrated them with the core-banking system. The ERP system implied a technologic that determines how control can be performed through financial and non-financial representations. The ERP system enabled the integration between processes and the elements of financial statements. Integration of business process at NB means automating all business processes and linking them with their financial aspects in one integrated system. A member of the IT team confirmed that:

> Before implementing an ERP system, there were many controlling problems on the business processes as they weren't linked or integrated. Integration, when needed, has been done on manual base and result in many errors. Therefore, we were looking for improvement through efficiency and integration in all business processes. (Head of the IT department)

The ERP system offered better internal control for managing employees and their financial affairs through integrating employees' performance, attendance, accounts, wages and capabilities. Moreover, these systems made a great enhancement for the internal control through integrating all inventory, purchasing and billing processes. The ERP system integration enhances the internal control system through securing the data transfer between applications without human intervention. Additionally, by using one integrated system, the cost of creating interfaces between separate systems was saved. Any transaction that took place in the core-banking system is reflected automatically in the ERP system, and there is no risk of data loss or miss posting to accounts. The external IT auditors stated in the focus group that:

> Before implementing a fully integrated system there were a need to transfer data manually between systems or through upload it in excel. Therefore, a lot of manual work on paper was needed around systems. This takes time and effort and increase possibility of errors… Thus, manual intervention or interface risks that come from forgetting or ignoring data transfer or editing in data before transfer are reduced. (IT External auditor)

While the ERP system enhanced the internal control system within NB, it may have an adverse impact. The ERP system allows the association of each process with multiple financial-statement accounts.

The association of key accounts with processes also establishes the link between financial-statement items and the risks that processes are exposed to. The senior internal auditor confirmed that:

> Once a transaction is approved, its financial impact directly affects all accounts at the same time. Previously, transactions were affect only branch accounts and then linked with others. Previously, an error could be corrected before it affects other areas but now because of the integration of the system an error can spread all over the bank. An error in any account can affect the whole bank as the system is fully integrated. (Senior financial internal auditor)

The integration provided by the ERP system improves the internal control system through reducing the time needed to collect and consolidate the financial and non-financial information from branches. The ERP system enabled NB to expand the GL accounts so as to be detailed and integrated with all other systems in use. The ERP system implementation at NB highlighted the importance of the "self-review" as any error at any branch will be reflected in the bank's overall system.

8.3.7 Multiple Methods of Control

The ERP system implementation wasn't just a case of changing IT system… We don't have internal auditors anymore who are assuring that transactions are going to the right account. Systems link transactions directly with their financial impacts. Moreover, there is a control directly on screen as each screen could be seen by two: maker of transaction and checker to review and approve the transaction. (Chief internal auditor)

The ERP system offers alternatives to financial controls based on logistical non-financial data. Therefore, traditional control based only on accounting numbers is combined with a system of control based on non-financial data.

8.3.8 Preventive Controls

Internal control of a manual environment was insufficient in preventing or even detecting errors in the accounting systems. The ERP system

controlled data input through mechanisms of errors prevention to ensure that data entered had valid values. The ERP system imposed processing constraints that prevent users from adding, updating, deleting and cancelling information beyond certain points. The automated segregation of duties prevents a single person from controlling two ends of a transaction. Strong evidence was found through interviews; for example, the ERP vendor stated that:

> …The ERP system is mainly based on preventive control principle. Each individual is allowed to do specific duties and prevented from doing others. It is very rarely that breaches happen in the access controls… This means that the internal control system turned to be preventive. The ERP system has strict security rules that prevent most of fraud opportunities. The ERP system definitely offers better preventive internal control system. (Oracle system vendor)

However, the ERP system offered better segregation of duties; internal auditors did not understand how this process is managed through the systems. This means that internal auditors were involved in the segregation of duties assurance before ERP system implementation, while after implementation this task became something to be checked by the systems and IT team. This change was related to the isolation of the internal auditors at NB from the ERP system implementation process. Moreover, it also reflects the weak role played by internal auditors in controlling the business after the ERP system implementation. Internal auditors lost part of their remit to the IT team. The senior internal auditor expressed his misunderstanding by saying:

> Previously, the concept was to define what do functions should do, while now the concept is what is to be done and who is needed to perform this. Previously, each function definition determines tasks and allocates employees to these tasks. Now, tasks are taking place need who and where. (Senior financial internal auditor)

The ERP system affected the aim of the internal control system regarding whether it should be based on preventive controls or detective controls and how the two should be mixed. A new concept of control

appeared with the ERP system implementation that is the self-review. The possibility of error spreading throughout the bank because of data integration enhanced the importance of the preventative controls. A senior internal auditor confirmed that:

> There is a new type of control that is self-control which means that each branch is responsible for the control system in the branch and to check for errors and correct them. This means that the internal control concept changed to be based on preventive controls and self-control as the checker in each branch prevents a lot of errors. (Senior financial internal auditor)

8.3.9 Standardisation

NB tried to run all branches in the same way as each branch was doing its tasks in its own way. To centrally manage branches, data should be gathered in a standardised way. One way to put data in the same format was to use one ERP. The ERP system was considered as control technology that emphasises the standardisation of business processes and information. The aim was to improve control by standardising accounting-related business processes across branches and the reporting from branches to headquarters. Moreover, because of standardisation, visibility was increased; data comparability and consistency were enabled and data redundancy was reduced. The external auditor of the bank stated:

> The bank realised the need for integrated solution to streamline and standardise business processes… Finance and human resources had multiple systems that were not integrated and processes such as payroll were not standardised. The bank decided to standardise processes through a single system. (External auditor of the bank)

8.3.10 Transparency and Visibility

The ERP system offered the ability to trace information and actions from the aggregate consolidated level down to the processing level. The ERP system enhanced the information transparency and made business transactions visible through tracing users' accounts for

internal control purposes. Control increased through increased information transparency and actions visibility to auditors across different business processes to provide a close view of the reality of the business operations.

To others, working in a more visible environment facilitated exercising control. Knowledge of being visible extended the exercise of self-control at the individual and branches levels. Knowing that one is observable means the exertion of self-imposed control. The ERP system enhanced visibility to peers and to managers. Visibility to peers was done through the interdependency of the business process through systems, and visibility to managers was done through more information provided in reports.

> The ERP system helped us to control inventory and prevent wasting in usage. Each branch tries to reduce their orders as it knows that its usage is seen by headquarter. Whenever a branch orders some items from store, automatically the cost of these items is added to the expenses of this branch… Previously, there was no strong control on the manual system. (Oracle inventory module manager)

Although the visibility offered by the ERP system enhanced the internal control within NB, internal auditors depend on the IT team to investigate and to trace the reasons behind any error. This was confirmed by many; for example, the financial module manager stated:

> Everything is transparent at the moment. If I look at it from the control perspective, it is a fantastic internal control tool. I can see the transactions and accounts of whichever branch I want. I can see all I need to see transparently and in real-time. Therefore, the IT team can help in mitigating error risks by notifying internal auditors about errors as the IT team have transparency to view all transactions on the systems. (Oracle financial module manager)

> The ERP system offers the IAF traceability to everything; however unfortunately internal auditors do not use it properly and they do not want to. The abilities are there in the systems waiting to be used one day. (Oracle HR module manager)

The ERP system had an impact on the three aspects of the internal control, and these are: effectiveness and efficiency of operations, reliability of financial reporting and compliance with relevant laws and regulations. The ERP system enhanced the effectiveness and efficiency of operations as the integrated data offered reductions in business cycle times. The integration of information across functional components provides greater control and accountability. The ERP system enhanced the reliability of financial reporting as the ERP system facilitated the monitoring process through the enforcement of internal controls used to ensure the accuracy of financial information. The ERP system enhanced the compliance with relevant laws and regulations. Control and accountability become inherent in the new processes. The ERP system made separated versions of control mutually dependent, and internal control became a collective affair. Therefore, it might not be particularly a property of the IAF as it became a collective affair.

The ERP system implementation at NB aimed to achieve better internal control through benefiting from all mentioned ERP system assumptions of control. Therefore, in order to improve the control system, some alignment efforts took place.

8.4 Aligning Efforts Among ERP, Governance and IAF

NB faced legal and regulatory requirements for greater transparency and more accurate and timelier information. The ERP system improved integration between business processes and transparency between applications. Oracle provided a localised ERP system to address the unique requirements of the Egyptian banking sector. This means that the ERP system is customisable to be aligned with governance goals in any country or sector. One of the IT external auditors in the focus group stated that:

> The ERP system offers the ability to address local requirements and legal obligations, language requirements, payroll needs and human resource management needs. At the same time…provide rigorous governance with complete visibility. (IT external auditor)

As a part of the banking sector development scheme in Egypt, business processes should be controlled through implementing the ERP system as recommended by the central bank of Egypt. As the ERP system was considered as control technology, they are by default in alignment with the governance objectives. When all rules, polices, regulations and work procedures are set into the systems, this should guarantee that all business processes are conducted in accordance with the rules. However, this is subject to the alignment efforts that took place during the implementation stages of the ERP system.

> All the ERP system assumptions in controlling the business improve the governance process. The ERP system provides accurate representations of current condition by making data widely available within and throughout the bank… The ERP system supports the accountability within our bank. (Head of the IT department)

The ERP system imposed their own logic on NB, forced the reengineering of processes and required corresponding realignment in controls. These alignments affected some functional areas, and the resulting changes influenced some structures, processes and employees. Gaining governance benefits from the ERP system depends on efforts in change management, processes reengineering, system customisation and the role of internal auditors as follows.

8.4.1 Change Management

Unfortunately, there was no predefined change management plan or proper training to prepare users for the changes. The training about how to use the system was not delivered as proper training but as a kind of briefing. There was no awareness of who should be involved in the implementation team. As a result of the absence of a plan, one of the main challenges of aligning the requirements of the business processes with the ERP system was the rejection of process reengineering. There was no intention to change any business process. There was foreknowledge about the strong commitment of the employees in the bank for

their old traditions. Evidence of the weakness of the efforts of managing change in NB was revealed through the interviews.

> We had a problem in the plan of implementation. Many issues have been ignored, especially the change management needed and the improvement in employees' and auditors' ability to use the new system. Ambiguity was the main challenge that we faced during ERP system implementation stage. We didn't get a proper training… We suffered a lot during the first stage of running the system. We still learn about the system features while using it. We faced many difficulties at the early stages of using the system; however various parties collaborated effectively to secure the success of this system. (Senior financial internal auditor)

When the ERP system was implemented, internal auditors were panic-stricken. They did not understand what was going on. They were very worried about their positions as they did not know how the ERP system worked or how the new systems would affect their way of working. There was a changeover period when two systems were running in parallel, an ERP system and a manual system. The ERP system was a formal system, and the manual system was informal. At that time, the internal auditors were confused and the changeover was a disaster as all transactions for the whole bank were audited going back 3 months revealing thousands of errors. Many employees depended on the manual system and forgot or ignored entering data into the new systems. A big team of external auditors spent a long time to assure the correctness of all numbers at NB.

8.4.2 Reengineering and Customisation

NB faced challenges in aligning other systems, other than the core-banking system, with the ERP system as the ERP required certain fields, characters and details to be in each file. A long time was spent in extracting compatible data from other systems to be provided to the ERP system's financial module. This problem was solved by some customisation to the ERP system.

NB as an old national bank preserved the traditional concepts and practice in many aspects of the business process, especially in the back-office practice. Therefore, implementing the ERP system that is embedded with the best practice at the back-office operations caused some conflict with the customary methods. NB insisted on following old processes and asked for customisation to be made to the systems. There were many control requirements; for example, there was a need for having a maker and a checker. Many cases of customisation and localisations of the ERP system were mentioned by the interviewees regarding control points. The following quotations illustrate some of the opinions expressed:

> One of the misalignments we had between the standard practice embedded in the ERP system and our practice was that it has one field for the foreign currency transactions, while we should have two fields one for the foreign currency and other for the local currency for control purposes… Therefore, it has been customised in the systems. (Oracle financial module manager)

> The system, which has been developed based on best practice in different countries, has nothing called "negotiable instruments" that are used widely in Egypt. The developed countries don't use these negotiable instruments as they use credit cards instead. The financial transactions in Egypt are mostly cash based not credit based. (Senior financial internal auditor)

In NB, there was some working around the systems through adding software or through keeping manual records apart from the ERP system. There was a claim that working around systems saved the cost of customisation and was preferred by all employees. Working around systems helped to keep routines and old ways of working. For example, the inventory module manager stated that:

> The system were not covering and satisfying all our needs. For example, there is something called secretariats, which means that an employee can get, for instance, a laptop to use for work purposes as a loan and return back after a while. Secretariats have no treatment in the system… All the details of these items are recorded in another system. Moreover, we

> have very strange secretariats such as slippers and cups that couldn't be recorded in the database. In such cases we have to work around the ERP system by adding some other systems separately that satisfying our very own needs… Systems such as for vehicles and secretariat systems we tailored to work around the ERP system and at the same time to save money. (Oracle inventory module manager)

Regarding the internal control and internal audit purposes, there was misalignment in the reporting format coming from the system and the format the internal auditors were familiar with. A reporting system has been developed to put all information needed by the internal auditors in the normal format that is understandable.

8.4.3 Internal Auditors' Involvement in ERP Implementation

Internal auditors were not involved in the ERP system implementation processes at NB. During the requirements gathering stage, direct users were asked about their business requirements. Internal auditors were neither involved in the implementation stage nor asked about their requirements. The study found that the IAF involvement in the implementation mainly depended on the effectiveness of the function within the particular bank. Only when the IAF is considered as an important function by the board could internal auditors be involved in the process. The IAF at NB did not receive proper attention from the managers who should have been responsible. Users of the ERP system were considered more important than auditors. One of the heads of the IT department stated that:

> However it was the idea of the financial controller that we should separate clients' transactions apart from bank's transactions; there was no apparent role for the IAF. There was no engagement from the IAF with the technical team; however there was contact between the internal auditors and other members of the team from the business side. We know that internal auditors have an idea that a new system is being implemented in the bank and there weren't any objections from their side. (Head of the IT department)

The absence of the internal auditors during the implementation stage not only had an impact on the implementation processes itself, but also had some repercussions on the IAF later on. If internal auditors are not involved from the beginning, they are unable to understand how the processes work. This was confirmed by many; for example, the ERP project manager stated:

> Internal auditors weren't involved at the early stages of ERP system implementation, therefore they had some reporting requirements after implementation stage had finished. IT team designed reporting software to fulfil auditing requirement. (Oracle project manager)

> The internal auditors' role started just after running the system… Internal auditors raised some control issues to the top management. Some of the issues raised have been solved through developing some new or substitute reports. (Senior financial internal auditor)

If internal auditors were involved in the implementation stage, they could save the bank the modification costs which took place later. Internal auditors could identify control weaknesses prior to the system going live. Identifying loopholes and strengthening the system during implementation is desirable. After everything was settled, internal auditors started raising issues which should have been sorted out during the early stages and they asked for reports which had not been activated.

8.5 The IAF Adaptation

At NB, there was no plan for how the IAF should be changed for the new regime after ERP system implementation. This situation is investigated and interpreted in the following subsections.

8.5.1 Scope of Services and Practice

The IAF at NB was affected by the traditional role and the inspection concept that was adopted for a long time by the central bank of Egypt.

The inspection function focused on assuring that all transactions were reviewed by reviewing compliance with the central bank of Egypt's rules and regulations and investigating cases of fraud. The IAF was not involved in risk management, and it had no active role in internal control assurance. The IAF neither adopted a systematic risk assessment approach nor developed risk-based audit planning. There was insufficient awareness about the importance of the IAF. This could be because there were other departments involved in internal control, risk management and compliance.

The apparent change was that the scope of the traditional IAF became narrower. The ERP system does most of the routine workload of reviewing and checking. The IAF was reduced, and its scope reduced as they stuck to the inspection concept. The ERP system automated integration made the traditional IAF much easier than before by depending on an easy and quick source of data.

> What has been really changed is the way of dealing with data, operations and the way of doing our job. Many transaction processing steps don't need to be audited as they are now done automatically by the system. (Senior financial internal audit)

> Although internal auditors still auditing based on print out from the system, they are benefited from ERP system implementation. Reports printed out from the system could take weeks to be prepared for audit purposes. (Oracle support team member)

Although the ERP system did the traditional auditing work, internal auditing was still needed to assure the effectiveness of the internal control system. The importance of transactions inspection was reduced, while authentication and access controls became more important than ever before. Some of the internal auditors were personally motivated and tried individually to adapt and played analytical and proactive roles rather than the traditional retroactive role. They became responsible for reviewing the self-controls at branches that prevent errors from being escalated through the systems. After implementing the ERP system, the new concept of comprehensive auditor appeared at NB. The

comprehensive internal auditor is aware of all the rules and is able to review more than one business process. Evidence was found to support the changes, and the manager of the financial module stated:

> Because of the integration of the systems an error can spread all over the bank. Therefore, comprehensive internal auditors now review the correctness of all checker activities those review transactions directly on the system before it affects all bank accounts. (Oracle financial module manager)

A senior financial internal audit added:

> Previously we had many auditors, one for each function. After implementing the ERP system, we moved towards comprehensiveness that means, we can say that we have a "comprehensive auditor". The comprehensive internal auditor is aware of all governance rules and can review more than one business process effectively. The IAF is under great scrutinise, research and development to reach the most appropriate structure and to design its practice in a way that adds value. The new concept of "self-review" decreases the load on the inspection function. Now there is no replication of duties but dual control. (Senior financial internal audit)

The ERP system shifted the focus of some internal auditors from functions to processes and from compliance, records and calculations auditing to analytical reviews. The ERP system enforced compliance and offered internal auditors many opportunities to improve their service through providing quicker assurance and reliable recommendation. The ERP system could shift internal auditors' role from being only inspectors to being analysts. The external auditor suggested:

> The ERP system opened new horizons only for creative internal auditors… Some seize these opportunities and improve this function while NB shrank it as it kept the traditional view of it; therefore logically it now gets narrower scope. (External auditor of the bank)

> The ERP system should change the role of internal auditors from auditing recording and calculating process to focus on development. The ERP system increased internal auditors' analytical capabilities… The ERP

> system offered reliable information that could be used for analysis purposes and for helping internal auditors to provide consultancy services; however internal auditors at NB didn't benefit from these opportunities. (Oracle system vendor)

Although many opportunities were available for internal auditors to improve their position and add value, NB did not encourage internal auditors to adapt their function. Shifting from an inspection to an advisory approach can be achieved through changes in some key areas in the way an IAF is conceptualised and structured. The IAF needed support from the audit committee and the top management to seize these opportunities and improve its practice. For example, the CIA stated that:

> I am totally unhappy with the current IAF. The IAF in current status will not be able to work as governance tool, which support risk management and internal control assurance. We are still working based on the traditional concepts of checking signatures and clarity of stamping even on higher levels. We are trying to show up that we are catching up with the new developments on the IS level and internal audit level; However we are still working using very traditional ways and trying to convert any IT work back to be paper based work. The IAF should be integrated with the risk management department, especially in the fully integrated working environment offered by the ERP system. The IAF should move from traditional check and flick to focus on risky areas and give these areas priority in monitoring and frequency of auditing. We still doing very tradition audit not based on risk. For example, when we find a small deficiency as not clear signature it is treated the same way as big frauds. We deal with all deficiencies as equal no matter how they will affect the business. Tiny things are treated as big issues. (Chief internal auditor)

8.5.2 The Structure of the IAF

The ERP system implementation reduced the traditional auditing workload; therefore, there was a change towards using comprehensive auditors. Comprehensive auditing at NB means using fewer auditors to do

more tasks. Auditors within branches do self-monitoring; while the centralised internal audit at headquarters does comprehensive inspection on the branches and high-level financial report auditing. The senior internal auditor asserted that:

> The organisational structure before implementing the ERP system was divided into functions now it is divided into possesses. Previously we had many auditors, one for each type of transactions. After implementing the ERP system, we can say that we have comprehensive auditors. (Senior financial internal auditor)

The internal audit department had inflexible staffing models and lacked skills in specific areas such as IT. Internal controls became a collective responsibility; therefore, many departments became more involved in monitoring internal controls after the ERP system implementation. There are different departments for internal audit, compliance, credit risk, quality assurance, quality control and the operational risk department that includes IT risk management. All these departments became involved in some way in internal control assurance. This could explain the low weight given to the IAF; however, it is suggested that the IAF should be the coordinator among all these departments. However, the researchers observed that there were poor communications between the IAF and the other departments as they were located in different buildings in different areas of Cairo. One of the IT external auditors in the focus group stated:

> There were many departments involved in monitoring internal controls after the ERP system implementation. Internal control assurance is not the responsibility of inspection or IAF only. Internal controls become collective responsibility. This means that departments' managers who are business owner of the data get involved in assuring effectiveness controls. Moreover, operational risk and risk management departments are interested in effectiveness of controls that mitigate risks. In addition, compliance department outline internal procedures and policies in order to be complied with rules and regulations. Security department with its technicality experience is involved in assuring technical control… The big problem is that the IAF should be the coordinator among all these

> departments; however at NB it started to get narrower. (IT external auditor)

It was recommended by most of the involved and interested parties that there should be the right mixture of diverse experience in the team that would establish an IAF as a governance model for business improvement. The external auditor recommended:

> There is no appreciation to the importance of recruiting specialised IT internal auditors. IT auditors should be combined as a part of the internal audit department. There should be an integrated internal audit team that include all needed specialisations in one department. (External auditor of the bank)

Internal auditors at NB were chosen from the most experienced employees who have knowledge about the business processes or from the central bank of Egypt. Therefore, it has been noticed by the researchers that they were older than the average age of the employees at NB. They believe in the traditional inspection concept, stick to their traditional work habits and were unwilling to change. Therefore, NB appointed younger internal auditors to the internal audit team after the ERP system implementation. They are more enthusiastic to gain new knowledge and to improve their positions within the bank. The CIA was the youngest and confirmed:

> Internal auditors usually were working as executives but once they get despised or they get older; then they are moved to be inspectors. They always used to send me over 55 years old inspectors… The main noticed change in the internal audit team is that we got much younger individuals to join the internal audit team. Younger internal auditors are more flexible and more able to adapt. Moreover, younger internal auditors already have much more knowledge about using IT and they are motivated to learn more about IS in business. Younger internal auditors have potential promotion opportunities; therefore they are more willing to accept new ways to work. In addition, they didn't get used yet to the old working environment. (Chief internal auditor)

8.5.3 Internal Auditors Skills

NB found difficulty in gaining the multidimensional skills needed to create an internal audit team comprising cross-functional members. The internal auditors at NB lacked the basics computer skills. It was observed by the researchers that only the CIA had a PC on his desk, while none of the other internal auditors had one. Therefore, they suffered a lot when the ERP system was implemented. The importance of understanding internal processes and verifying the accuracy of the ERP system was increased; however, internal auditors needed more knowledge in internal auditing standards. Internal auditors had very limited IT background, which was not enough to read the report produced by the system. They were not interested to know how these reports are prepared or in the code that produces the report. This was confirmed by many; for example, the senior internal auditor stated:

> Older traditional internal auditors in our bank was frustrated when these systems were implemented. Some of them didn't know anything about the keyboard. Seriously speaking, some of the internal auditors didn't know how to write a report as they were not familiar with the keys in the keyboard. One auditor spent days to write a single report. Therefore, they struggled in using the computer itself, what about fully integrated systems. (Senior financial internal auditor)

> Some of our internal auditors were catching the mouse up on the air and try clicking it. Therefore, some of them get bored as they weren't able to catch up with new working environment and they resigned and some applied for early retirement. I can't expect much from these inspectors. These auditors are not motivated to improve their skills, knowledge or awareness. They are looking to be retired soon. (Chief internal auditor)

The main change in the internal auditors' skills was that they gained knowledge about the whole business process. Having comprehensive internal auditors encouraged them to know about all functions. Moreover, there was an increase in the IT skills of few of the adapted internal auditors. The senior internal auditor stated:

> By having comprehensive auditors, the IAF add more value and internal auditors' skills are increased. Internal auditors took some inspections training sessions. Whoever was auditing specific type of transactions; now starts gaining knowledge about auditing other types of transactions. (Senior financial internal auditor)

> IT skills for some internal auditors were raised after the ERP system implementation. Some were enforced to improve their capabilities related to IT in order to continue in internal audit team. (Chief internal auditor)

It was suggested that internal auditors better change to embrace ERP and acquire the requisite technical skills and knowledge. It was emphasised that the ERP included several controls which have not been used yet because of unskilled auditors. The ERP was seen as a good option, but the main challenges were technical skills. It was suggested that internal auditors should be trained to review modifications in the authorisation roles according to changes in individuals' movements. The external auditor added that:

> However the ERP system offered new control features and new controlling logic; the internal control system effectiveness ultimately depends on competency of internal auditors and their understanding to the IT controls new logic… In order to assure functionality and effectiveness of internal controls, internal auditors should be qualified and have the ability to change their way of thinking. The most important aspect that needs to be enhanced is the IT audit; especially in the ERP system working environment. Internal audit team should contain all needed skills. Specialists in IT audit should be recruited; otherwise the internal audit team should be trained, educated or qualified in order to get enough awareness of how to do IT auditing. The ERP system made the IAF enjoyable but only for those who understand business process through it and able to change to deal with it. (External auditor of the bank)

Auditors' abilities to gather information, to examine, to evaluate and to communicate should be taken into consideration with the growing technological complexity of the banks' systems. Educational programmes should be adjusted to the changes that are occurring in the

field of auditing. It is vital to understand the changes taking place in assurance services.

8.5.4 Internal Auditing Tools

The IAF at NB used to be a traditional one that depends on a paper-based audit. There was no specific auditing tool used at NB before or after the ERP system implementation; however, "Business Objects" reporting software was implemented with the ERP system. This is an interactive reporting application that is widely used for integrated enterprise reporting. The ERP system offered essential reports effective for auditing purposes. The manager of the financial module stated:

> With Business Object there is no need for any expertise in underlying databases and it empowers with a simple click and drag interface to find the data you need in seconds. Business Object is a layer resides between an organisation's database and the end user. It is a business representation of transactional database. It allows the user to interact with their data without having to know the complexities of their database or where the data is stored. (Oracle financial module manager)

However, the ERP system is considered as a control tool which can assist the IAF. These systems were not fully used by the internal auditors. Moreover, internal auditors did not understand all the control features in the ERP system. The ERP system offered auditing tools that could be used to support the auditing process such as query access or audit trail to show all the transactions that were entered on the system; however, it was not used properly by the internal audit team. The senior internal auditor stated:

> ERP was the most important development related to the IAF during the last decade. As the ERP system offers access to up to date data, the audit process has been facilitated. The ERP system offers essential reports that their effective has been proved for auditing purposes. Our IAF in the bank doesn't use specific software for auditing. (Senior financial internal auditor)

> The authorisation and security in the system is the new powerful tool to assure better controls…; however internal auditors don't fully understand these options. (A controller of the central bank of Egypt)

8.5.5 The IAF Sourcing

The common perception at NB was that IAF can be done by anyone and there is no knowledge required except related to the business processes; therefore, there was no need to outsource the traditional inspection function after the ERP system implementation. Internal auditors were inspecting the core-banking system's results; therefore, they dealt with the ERP results in the same way. The manager of the inventory module stated:

> Internal auditors are ticking boxes and compare numbers to find if there is any variation. Therefore, there is no need to outsource this function as anyone knows the business process well can do it. (Oracle inventory module manager)

The lack of basic computer skills caused problems, mistakes and errors. Auditing basic entries did not require any specific skills, but the lack of general computer skills was emphasised in auditing complex transactions, applications and in correcting mistakes. Internal auditors did not have the experience and tools to do IT tests. There was insufficient awareness about CAAT. The common perception regarding the IT audit was that it is only needed during the implementation phase. It was a new area that none of the internal auditors had any idea about. The IT audit was very poor at NB, and no auditing software was used even after the ERP system implementation. There was a risk depending on the IT department to do IT auditing. The IT department is a management department and was not independent; therefore, they cannot audit themselves. Therefore, IT auditing was outsourced to service providers who can bring in the required expertise and experience. There was scarcity of qualified IT auditors; therefore, the cost of having a qualified IT audit team might be greater than outsourcing this function. The external auditor asserted that:

> …NB didn't have the qualifications needed to do IT audit after the ERP system, they outsourced the IT audit. They preferred to depend on our experienced IT team as we have experience in auditing at many other banks that implemented the ERP system and it is less cost for them… (Senior external auditor of the bank)

> There is a need to use audit software such as CAAT. Internal auditors need training on how to audit IT. For us we have all support we need to learn more through open access on many internet site especially designed for enhancing our capabilities besides the international network. (IT external auditor)

There was a debate at NB about whether individuals from the IT team should take audit training sessions or should individuals from the audit team take IT training sessions to assure the IT controls. The decision was to take a number from both departments with more weight from the auditors and qualify them according to their required skills. However, the final decision was to outsource the IT auditing until this department is established. Outsourcing increases the operating risks such as lost or reduced control over the IAF in case of suddenly terminating the outsourcing arrangement; therefore, the bank should have a contingency plan such as moving some internal auditors to be IT auditors.

8.5.6 Internal Auditors' Relationship with the IT Department

The collaboration between the IT team and internal auditors increased after the ERP system implementation. The mutual working relationship became closer as they worked as complementary teams; however, IT control and risk mitigation are the responsibility of the IT team alone. Internal auditors should understand the business process going through the systems in order to be able to audit but without understanding the technical details, while IT team should implement controls that they have been asked to implement without fully understanding the logic behind them.

The importance of the internal auditors went down compared with the IT team. At NB, it was preferable that internal auditors do not have access directly on the ERP system. It is better to minimise users' access on the systems to avoid any interruption. Moreover, internal auditors preferred not to deal directly with the systems as they do not have enough knowledge to write or run queries. The IT team has experience with the systems as they have participated effectively in the ERP system implementation. The IT team provided internal auditors with enough knowledge so that they could run the reports which they required for themselves. IT individuals were considered as enablers for internal auditors. The IT team fixed any weaknesses raised by the IAF and offered opportunities to improve the internal controls. The inventory module manager stated that:

> We have a continuous working relationship with the IAF. It is a mutual working relation. Whenever internal auditors face a problem or difference between the system report and paper documents, the first thing to do is to contact the IT team. On the other side, whenever any modification is done on the system, the first thing to do is to contact the internal audit team to discuss this modification. We get closer after ERP system implementation… The ERP system increased our working relationship and gave both of us great opportunity to understand others work. At the end we are working together as complementary jobs. (Oracle inventory module manager)

The IT team has a privilege on the system to support auditors' needs for reports even if there is a problem with the system. The IT team used a reporting system to extract data directly from the database even if the application is not working.

8.5.7 The Size of the Internal Audit Team

The ERP system made the traditional IAF easier and centralised; therefore, the size of the internal audit department decreased. The ERP system decreased the efforts of the internal auditors and saved their time; therefore, some of them were assigned to do other jobs. Most internal auditors were redirected to do other jobs, especially for those which are

related to HR, inventory and purchasing. Auditors who were no longer needed were not fired but redeployed to other roles. A controller of the central bank of Egypt stated:

> After the ERP system implementation, the number of internal auditors was decreased because of the centralisation offered by the systems. When I go to inspect in any department I find that the number of internal auditors is decreased as there has been centralisation in headquarter in Cairo. (A controller of the central bank of Egypt)

> The systems control most of the transactions; therefore there is no need to keep all the internal auditors as they will hinder the process. For example, when we ran the HR module, all those who were in HR departments in all branches have nothing to do now. All these employees and internal auditors have been redirected to do other jobs. (Oracle HR module manager)

8.5.8 The IAF Budget

The budget assigned to the IAF was reduced by the ERP system implementation. The ERP system reduced the work of the internal auditors; therefore, some of them were assigned to do other jobs. Moreover, the IT audit outsourcing increased as a new component in the budget assigned to the IAF. There was insufficient awareness of the needs of the IAF, as demonstrated by reducing the budget assigned to this function. The head of the IIA chapter stated:

> NB has wrong perception that implementing the ERP system should save part of the budget assigned to the IAF, while the ERP system should be combined with improvement of the IAF. The internal audit team should be increased and new tools should be used. (Head of the IIA chapter in Egypt)

8.5.9 Internal Auditors' Relationship with the External Auditor

It was supposed that implementing the ERP system could improve the working relationship between internal auditors and external auditors; however, it had a negative impact on the confidence of the external

auditors based on their belief about the low level of internal auditors' qualifications at NB. External auditors believed that the IAF within NB needed to be adapted to the new ERP working environment. Therefore, external auditors became more suspicious. As the external auditor confirmed:

> At NB, internal auditors graduated from commerce high school not even collages. Therefore, we base our judgements on considerable experiences of internal auditors that substitute the high qualifications. However, after ERP implementation we are sure that internal auditors' experiences are not compatible with the new ERP working environment. At the case of NB, the relationship and communication didn't change by implementing the ERP system. However, to be honest it gets worse. (Senior external auditor of the bank)

8.5.10 The IAF Strategic Response

The ERP system cannot be separated from the whole business process; therefore, their impact on the IAF was apparent. The ERP system caused uncertainty for internal auditors about the nature of their work. They were confused about the best way of doing their tasks as the systems do most of what they used to do. Internal auditors at NB were divided into two groups: most were kept to do the traditional job, redirected to other jobs or chose early retirement, and a smaller group had the personal motivation to adapt as much as possible.

Internal auditors who could not deal with IT systems and wanted to keep their old working routines were assigned to the remaining traditional tasks or other jobs. They were unable to change their work habits and learn something new. Furthermore, many internal auditors escaped from using the systems through early retirement. The manager of the inventory module stated:

> Internal auditors are still doing their jobs using the same logic that has been used to audit manual work. They still tick boxes. They didn't feel the change, because they don't want to change. The only change is that they are now getting the needed information to complete their mission

> through computers. The ERP system offers new options but they refused totally to change their work habits. They claimed that the new way will delay the process and will make them tired and to learn something new is not acceptable. They changed whatever they can to paper based as they get used to before. (Oracle inventory module manager)

The institutional framework helps tease out the processes of the IAF adaptation. Internal auditors at NB used some responses during the first year of the ERP system usage. At the early stage of the ERP system usage, internal auditors used the defiance response that is a more active form of resistance. The defiance response was manifested through tactics of attacking, challenging and dismissing. Internal auditors attacked the ERP system by claiming that using this system will delay the processes as it needs more effort to get used to it. Using the ERP system for internal audit purposes was unacceptable as this would require changing the routine and gaining new knowledge. Moreover, efforts took place to prove that these systems had failed in offering better control.

The ERP system imposed the need to adapt as previously discussed; however, internal auditors were challenging all new working requirements through adherence to the traditional routine. The clearest tactic used was dismissing and ignoring the new explicit controlling assumptions of the ERP system. Internal auditors ignored the new requirements and continued with their function as usual. Internal auditors claimed that the ERP system is not related in any way to their work. They argued that they could do their tasks as usual without dealing with the IT systems. Their ignorance of the required adaptation to the ERP system was exacerbated by the internal auditors' deficient comprehension of the rationale behind the ERP system's control assumptions. Internal auditors chose to dismiss the adaptation requirements after implementing the ERP system as they believed that maintaining the traditional concept of the central bank of Egypt as an inspecting function would maintain their profession legitimacy. The central bank of Egypt controller stated:

> At NB, internal auditors…think that implementing new systems in the bank was not related totally to their work; therefore they are trying to

> avoid dealing with the systems. Internal auditors at NB are insisting on keeping their working habits as inspectors and refuse to open their minds and accept any change. (A controller of the central bank of Egypt)

Over time, it became clear that the internal auditors' efforts had not succeeded in beating or dismissing the change in the working environment brought about by the ERP system introduction. Then, the internal auditors used an avoidance response through tactics of escaping, buffering and concealing. They claimed that there was a high level of uncertainty about the nature of the internal audit practice after implementing the ERP system. The internal auditors decided that the cost of responding to the needed for change was too high. The internal auditors escaped from dealing with the systems through preferring early retirement or resigning outright rather than adapting to the new requirements of the ERP system working environment. The senior internal auditor stated:

> The implementation of these systems resulted in early retirement of many internal auditors all over the bank. At the beginning, a lot of employees and internal auditors didn't understand how the business process is going through the systems. There were huge changes in the way of doing internal auditing, thus traditional internal auditors found in the early retirement an opportunity to escape as they weren't able to improve and develop their way of working. There was a psychological effect upon most employees that they felt that they were not able to deal with the new systems. The new system brought new logics of work that they were not familiar with. They were confused and stressed. There weren't any knowledge about these systems before; therefore many auditors escape from dealing with the systems through the early retirement… They gave up and started searching for any way to avoid using this technology. They couldn't ignore the systems as it is a huge project implemented all over the whole bank. Many internal auditors assured that they were not able to be compatible with the new working environment. Then they prefer the option of early retirement. (Senior financial internal auditor)

Internal auditors used the buffering tactic through loosening their attachment to the ERP system arguing that these systems were out of

their domain. Then, the internal auditors tried to demonstrate that they were trying to catch up with the new technology. Thus, they were using the conceal tactic through appearing to comply with the new working environment, while intentionally avoiding certain aspects of it. They disguised non-conformity behind a facade of acquiescence. The CIA stated that:

> We are still working based on the traditional concepts of inspection through checking signatures and clarity of stamping even on higher levels. We are trying to show up that we are catching up .with the new developments on the IS level and internal audit level; However we are still working using very traditional ways and trying to convert any IT work back to be paper based work. (Chief internal auditor)

After fixing all deficiencies caused by using two parallel systems and the early retirement of those who believed that they would not be able to adapt, the ERP system usage stabilised within NB. The remaining internal auditors considered the unqualified conformity unworkable; therefore, they used a compromise response through the balance tactic. The balance tactic was an attempt to achieve parity among stakeholders' expectations and internal interests, and it included: outsourcing the IT audit; creating a closer working relationship with the IT team; recruiting younger internal auditors with better IT skills; disposing of the older internal auditors; and using the comprehensive auditor concept. The senior internal auditor stated:

> It took long time to reach stability after implementing the systems. It was like a race; whoever can bear stress for longer wins. Moreover, this depends on the ability to improve the capabilities and accept the movement from old to new integrated systems. We faced a lot of difficulties; however various parties collaborated effectively to secure the success of these systems. Evidence is that even after these employees and auditors left their jobs, the system succeed. Their existence was an obstacle that constrains gaining system benefits at the beginning. (Senior financial internal auditor)

Compromise was employed in the spirit of conforming to pressures, but compliance was only partial, and auditors were more active in promoting their own interests. Internal auditors anticipated that legitimacy gain would be low; therefore, they attempted to compromise on the requirements for conformity. The ERP system triggered profound changes, and internal auditors were not properly prepared for the changes; therefore, compromise, avoidance and defiance were consequences of the changes created by the implementation. These strategies are more likely to occur when anticipated legitimacy is low. Internal auditors perceived the extra effort required for utilising the ERP system as a losing proposition that would bring little gratification.

8.6 Legitimacy of the IAF After ERP Implementation

In the case of NB, the conformity with conventional beliefs legitimated (as suggested by Selznick 1996) and justified internal audit traditional practice in response to the internal and external environments. The IAF at NB maintained its legitimacy through adhering to the inspection concept that was acceptable practice by the central bank and within the national banking sector. This means that internal auditors maintained their moral legitimacy through following what is considered as an acceptable practice in the field. In accordance with Meyer and Rowan (1977) and DiMaggio and Powell (1991), who assert that individuals and organisations respond to pressures resulting from their institutional environments by developing rules that are socially accepted as being the most appropriate, even if these practices are inefficient, internal auditors' adaptation at NB was not with the aim of improving the IAF to add value, but a pragmatic attempt to secure their jobs and maintain their professional legitimacy.

An inspector has no role to play in the internal control assurance or risk management. Therefore, the internal auditors at NB were not interested in maintaining their functional legitimacy through their ability to do these tasks after the ERP system implementation.

8.6.1 Ability of the IAF to Provide Control Assurance

At NB, internal auditors focused on compliance with rules and regulations that are one of the crucial aspects of internal control; however, this list could be expanded to include accountability, effectiveness and efficiency of operations that takes into account the expectations of the stakeholders. The case study evidence revealed the critical role played by the ERP system as a tool to support the internal control process. With the ERP system implementation, traditional processing controls became obsolete.

At NB, the IAF emphasised financial controls, while the IT department paid more attention to technical controls. It is suggested that the internal auditors at NB should pay more attention to the segregation of incompatible IT tasks and duties. Clear and strict procedures should be set to prevent IT operators and schedulers from gaining access to programme documentation and databases.

8.6.2 The IAF Ability to Support Risk Management

Poor governance practice increases risks; therefore, the standards of internal auditing require the adoption of a risk-based approach. Unfortunately, the results of this research show that this requirement was not applied at NB. Changing the business processes after the ERP system implementation raised new risks related to using new technology that most employees were not familiar with. The nature of risks differed from those of legacy- or manual-based systems. One apparent risk was the resistance to change as most of the employees refused to work on these systems. While IT and risk management departments were responsible for assessing and managing these risks, internal auditors had no identifiable role. In addition, the ERP system offered features to help in risk management; however, these features were not used at NB. The risk management department is not depending heavily on IAF.

> The system failure affects the data flow. In this case it is our responsibility as IT team to investigate how this failure affects the transactions'

> result. If anything wrong happen within the system, only the IT team is the responsible to fix it and try to see why this mistake went through the system without giving any alert. IT team always review the transactions log on the system. There is a risk management department responsible for all kinds of risks… Unfortunately, the risk management department only follow risks as a police and leave it for each department to cover these risks and how should it be mitigated…, nothing to do with the IAF… The new risk that internal audit are interested in is the possibility of variances occurrence between the GL in the core-banking system and the total of the detailed GLs in the financial module of the ERP system. (Oracle financial module manager)

However, the ERP system offered the internal auditors a good opportunity to be more involved in the risk management process, but they preferred to avoid using the systems to improve their professional position.

8.6.3 IAF Importance After Implementing ERP

Internal auditors were not welcomed by the auditees as they were considered as inspectors who were looking for errors and to punish the negligent. Even internal auditors themselves at NB believed that their function is not very important. Many other departments in the bank were involved in internal control and reporting to the audit committee. Furthermore, NB did not enhance adapting the IAF as there were no written objectives for this function because it was an oral working environment. Therefore, IAF adaptation depended on individuals' efforts as there was no written plan for this. The ERP system implementation did not raise the importance of the IAF; however, it highlighted the deficiencies and areas that needed adaptations in the IAF. The CIA stated:

> The IAF is considered by most employees as a function that precludes and delays the business process and everything will be fine without internal audit… The IAF in current status will not be able to work as governance tool, which support risk management and internal control assurance. (Chief internal auditor)

Recently, the central bank of Egypt has issued instructions on bank's governance, which should be followed by all banks from March 2012. This confirms some of the study results and suggestions. It has raised the IAF as an important governance tool; for the first time, the IAF was mentioned clearly in a separate section. It highlighted the lack of written procedures that were a constant challenge. "Description of functions, powers and responsibilities of internal audit must be documented in writing." The instructions highlighted the internal audit responsibilities are to, "Assess the internal control system capacity (including risk and compliance departments)."

8.7 Case Study 3—Conclusion

No coercive rules were devoted to the IAF, but it was identified as an inspection function only indirectly through determining the audit committee's responsibilities. Normative pressures have a negative impact on improving the IAF because of the weak professional and educational environment.

The ERP system assumptions at NB highlighted the importance of the self-review and enhanced visibility to peers and to managers. The ERP system makes separated versions of control mutually dependent, and internal control became a collective affair; therefore, it might not be the sole property of the IAF.

As the ERP system was considered to be control technology and was recommended by the central bank of Egypt, it was in alignment with the governance objectives. However, there was no predefined change management plan or proper training to prepare users to accept changes. Therefore, two parallel systems were running at the same time, ERP and manual systems. NB asked for customisation to be made on systems and some working around. There was a misalignment in the reporting format coming from the system and the format which the internal auditors were familiar with; therefore, a reporting system had to be developed.

The scope of the traditional IAF became narrower. Internal auditors at NB were divided into two groups: some were kept to do the

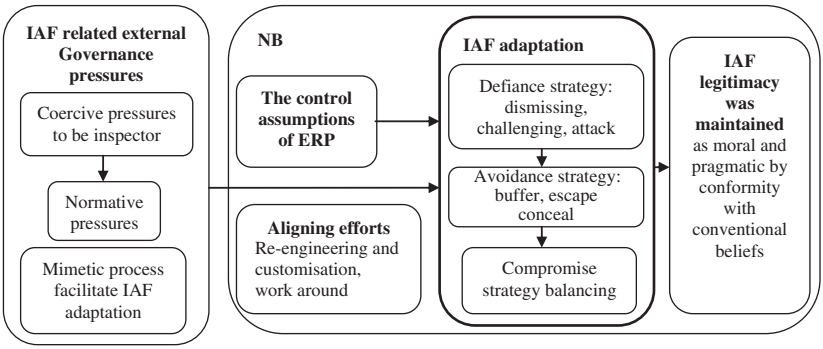
IAF related external Governance pressures
Coercive pressures to be inspector
Normative pressures
Mimetic process facilitate IAF adaptation
NB
The control assumptions of ERP
Aligning efforts
Re-engineering and customisation, work around
IAF adaptation
Defiance strategy: dismissing, challenging, attack
Avoidance strategy: buffer, escape conceal
Compromise strategy balancing
IAF legitimacy was maintained as moral and pragmatic by conformity with conventional beliefs

Fig. 8.1 Case study 3—summary of main findings

traditional job, redirected to other jobs or chose early retirement, and a smaller group were personally motivated to adapt as much as they could. A new concept of comprehensive auditor appeared at NB, who is aware of all the rules and is able to audit more than one business process. The internal audit department had inflexible staffing models and lacked skills in specific areas such as IT. Therefore, many departments were involved in monitoring internal controls after the ERP system implementation. NB recruited younger internal auditors in the internal audit team after the ERP system implementation. The change in the internal auditors' skills was that they gained knowledge about the whole business process so that they could be comprehensive internal auditors. IT auditing was outsourced to service providers who could bring in the required expertise and experience. The importance of the internal auditors declined compared with the IT team, who started doing some audit-related duties.

At the early stage of the ERP system usage, internal auditors used the defiance response through tactics of attacking, challenging and dismissing. Internal auditors chose to dismiss the adaptation requirements as they believed that maintaining the traditional concept of inspection maintained their profession moral legitimacy. Then, internal auditors used the avoidance response through tactics of escape, buffer and conceal. After fixing all the deficiencies caused by using two parallel systems and the early retirement of those who believed that they would not be able to adapt, the remaining internal auditors

considered the unqualified conformity intolerable; therefore, they used the compromise response through a balance tactic to maintain pragmatic legitimacy. These main conceptual findings are summarised in Fig. 8.1.

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9

Findings from Case Study 4—The International Bank (IB)

9.1 Background and Overview

This case was conducted at one of the largest international banks operating in Egypt providing a comprehensive range of banking and related financial services through a network of more than 160 branches covering 24 governorates. The bank is one of the top banks in Egypt serving more than 600 thousand clients through 4200 banking professionals. The bank has relied on in-house development systems for the core-banking operations. These systems were built around the bank's product lines. As a consequence, the IT architecture forced the bank to make use of a number of isolated solutions instead of seamlessly integrating ISs. Therefore, there were strong motivations for implementing the ERP system such as the standardisation of the banking regulation, compliance on the international level and the globalisation of the banking industry. The bank implemented an Oracle ERP system at the beginning of 2010.

In the banking sector, where the dissemination of ERP systems is low, the scope of ERP systems is smaller than in the manufacturing sector. Therefore, the bank implemented financial accounting, assets management, inventory, controlling and human resources modules. The ERP system at the bank embraced back-office functionalities. The bank was selected

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Table 9.1 IB interviewees and other sources of evidence

The positions of the interviewees
Chief internal auditor (CIA)
Head of the compliance department
Head of the operational risk and control department
Head of the IT department
IT consultant (participated in the ERP system implementation)
Focus group of five of the IT auditors
General internal auditor
Head of the IT audit team
Senior financial internal auditor
Branch manager
Head of the supervision department at the central bank of Egypt
Senior external auditor (of the bank)
External auditor (involved in auditing the bank)
Oracle vendor
Member of Oracle support team
Head of the IIA chapter in Egypt
Sample of documents: Egyptian corporate governance code, Basle II, function and business instructions manuals, archival documents, internal memos, internal audit reports, corporate governance statement of the bank, external audit reports, internal job descriptions, business instruction manuals, instruction manuals, Oracle materials, informal conversations, the regulations of the central bank of Egypt and consultancy reports.
Sample of observations: relationship between the IAF and other departments, arrangement of the internal audit department, the IAF use of computers and automated tools, the availability of internal audit job descriptions and manuals.

because of a combination of accessibility and representativeness. This international bank will be referred to as IB for confidentiality purposes. Fifteen interviews and one focus group with the stakeholders were conducted, and all related documents and observations were analysed as summarised in Table 9.1. In the following subsections, the findings related to each construct of the conceptual framework will be presented and discussed.

9.2 IAF-Related Governance External Pressures

Over the past years, legal governance requirements in banking have become more demanding, taking the compliance, risk management and audit function to a higher level of complexity. The ERP system assisted

IB to comply with governance requirements, such as Basle II, SOX and IASs. The Oracle system intrinsically has compliance and regulatory functionalities that helped IB in fulfilling its regulatory duties and auditors in assuring compliance, effective controls and risk management.

9.2.1 IAF-Related Coercive Pressures

As discussed in the previous case, in Egypt there is no law compelling banks to have an IAF. The central bank of Egypt has the authority to enforce the improvement of the IAF; however, there was insufficient attention given to it. Current international trends of governance and risk management significantly affected the role of the IAF. IB is listed on international stock markets; therefore, it is subject to compliance with the requirements of the SOX that prescribes the use of risk-based internal auditing. The risk-based internal audit should provide assurance that risks are assessed and mitigated continuously and monitoring activities over internal controls are well designed. Therefore, IB appreciates the importance of the IAF. As stated in the CG statement of the bank for 2012 that:

> Audit projects are often closely aligned to the Group Risk Management because of the risk-based approach used to prioritise audit work…The Audit Committee ensures that the IAF is adequately resourced and continues to have appropriate standing within the Group. It also reviews the internal audit plan including any significant findings and the effectiveness of IAF.

IB has to state in the annual report how it applies the main principles of the UK Combined Code of corporate governance (2010) and whether it complies with its provisions or provides a reasoned explanation where they do not. The combined code and Basel requirements stress the need for establishing relevant internal control systems and adequate risk management. The importance of the IAF has been highlighted in the UK Combined Code (2010) through determining the responsibilities of the audit committee:

> The audit committee should monitor and review the effectiveness of the internal audit activities. Where there is no IAF, the audit committee should consider annually whether there is a need for an IAF and make a

> recommendation to the board, and the reasons for the absence of such a function should be explained in the relevant section of the annual report.

The IAF is governed by the IB group audit standards manual that is the primary instruction manual for audit that details all key policies and procedures. This manual is based on the International Standards for the Professional Practice of internal auditing and code of ethics of the IIA, ISACA, combined code and Basle, etc. IB turned the normative pressures of the international standards into being coercive pressures through incorporating them in the formalised manual that should be followed as IB requires compliance with the national or the international regulations whichever is stricter. This point was supported by the compliance officer who said:

> Our local environment doesn't binding us to comply with international standards; however being affiliated to international group we are 100% binding to all standards as we are exposed to more strict group requirements. All governance rules and regulations are merged into our bank's policy and procedures. National requirements are much lower or less sophisticated than international group requirements that we comply with; therefore we are always in safe side as local requirements are easy to apply without contradictions. In Egypt the group requirements are stricter than local requirements; therefore it is easy to align the ERP system with our group requirements. (Head of the compliance department)

9.2.2 IAF-Related Normative Pressures

IB applies the international standards of the IIA, ISACA, Egyptian governance code, Basle II, the group rules and internal policies and procedures. The IB group keeps a sound internal audit professional network. IB is keen on internal auditors' qualifications, report writing skills, following the manual and planning in all IB worldwide. All related governance standards confirm that the banks' governance should be supported by a strong IAF, which monitors not only compliance but also the validity of systems and controls. For example, the Basel Committee issued paper (2012) on *internal audit in banks* and this

document replaces the 2001 document internal audit in banks and the supervisor's relationship with auditors, asserting that:

> Each bank should have a permanent IAF. The senior management should take all necessary measures so that the bank can continuously rely on an adequate IAF appropriate to its size and to the nature of its operations. These measures include providing the appropriate resources and staffing to internal audit to achieve its objectives. The scope of internal audit includes: the review of the management and financial ISs, including the electronic IS; the examination and evaluation of the adequacy and effectiveness of the internal control systems; the review of the application and effectiveness of risk management procedures and risk assessment methodologies; the review of the systems established to ensure compliance with legal and regulatory requirements, Senior management should ensure that the internal audit department is kept fully informed of new developments, initiatives, products and operational changes to ensure that all associated risks are identified at an early stage. The IAF department as a whole must be competent enough to examine all areas in which the bank operates.

IB has an internal audit charter that enhances the standing and authority of the IAF within the bank and insists on all the recommendations of Basel. The IAF has access to any records, files or data of the bank. IB is strongly aware of the normative pressures and enforces them by turning them into coercive pressures through the audit manual and audit charter.

9.2.3 IAF-Related Mimetic Pressure

The working environment in IB is different from national banks. Therefore, the IAF was affected by the international organisational culture of the whole IB group. Internal auditors at IB Egypt came from the big four audit companies. All internal auditors at IB Egypt look to the success of the IAF through the IB international professional audit network and through their relationships with the big audit companies. Internal auditors are open to international developments of the IAF. An internal auditor stated:

> As we work in a big international bank and most of the team came from the big four, the concept of the modern IAF is transferred into the bank in Egypt. We are always interested in knowing all new trends and practice in this area. All process and procedures are well-defined… Well-documented processes plus well-qualified persons give best governance practice. Before the ERP system, our bank had standard process and policies followed by all employees. These processes were approved summarised in workflow manner. (General internal auditor)

9.3 Control Assumptions of ERP

Some of the main motives for IB to implement the ERP system were to reduce errors in information flow, to support the sharing of information, to support teamwork and to improve internal control. IB wanted to improve control within key areas because it used fragmented and disparate business processes. Internal control systems became stricter after implementing the ERP system. The ERP system made the mission of making fraud more difficult. Almost all interviews confirmed that the ERP system changed the risk-control landscape within IB to a better one. An internal auditor stated:

> The ERP system enforced very good internal control system components… The ERP system offered many related control activities. One important component of the internal control system is the information and communications and the ERP system have great impact in this area through reports. Therefore, the ERP system is considered as perfect governance tool that each internal auditor should master. (Senior financial internal auditor)

The ERP system was considered as a governance tool to build an internal accountability system. However, participants related their effectiveness in supporting governance process to having a very developed IAF. To gain all benefits of control when implementing the ERP system, its implementation should be accompanied by internal audit professional use of its capabilities. The consultant stated:

> The ERP system is considered as a corporate governance tool; especially because of that internal audit team are making the best use of them. Our internal audit team fully understands all available options in systems. The IAF use all different reports provided by the system. (IT consultant)

> The ERP system is technical translation to governance rules from paper to practice by the mean of bringing the governance rules into reality; however this depends on the internal auditor efficient use to systems. (Chief internal auditor)

The assumptions behind the control principle were explored, and the perceptions of the internal auditors are highlighted as well in the coming sections.

9.3.1 Automation

Human errors were more than computer errors at IB. The ERP system offered better automatic monitoring controls that could not take place without these systems. The ERP system offered the opportunity to implement some extra automated controls and automatically generated reports for monitoring and auditing purposes. Automation provided by the ERP system reduced routine tasks and non-value-adding auditing efforts. The business process which is automatically controlled gives the internal audit confidence about the internal controls and reduces possibilities of fraud by a significant amount. Although IB applied automated business processes a long time ago, the ERP system has been applied in some areas that were dependent on some legacy systems with non-automated controls. Automated controls are stricter than manual controls and helped the auditors to be sure that all data are secured, accurate and complete. Participants appreciated the impact of the automation on the IAF.

> ERP automated controls are instrumental in eliminating time-consuming audit activities such as paper management. By automatically produced operational information compared with financial information our auditors get detailed reports about processes, earnings and performance and subsequently use this knowledge to offer better assurance function. (IT auditor)

The automation brought with the ERP system encouraged the IAF to change the communication of audit results and reports to being mostly automated. Tracing audit comments or internal control comments became automatic. These systems helped internal auditors for better confirmation that all control issues are closed and implemented and any ratification required from the business side has been done. Consequently, there could be quick assurances that all control comments were applied accurately. This was done through some special software implemented with the ERP system.

9.3.2 Centralisation

For IB as a big bank, the centralised database that gathers all data was essential. The ERP system enhanced the centralisation concept of all data within IB. The centralisation offered by The ERP system enhanced internal control through improving data availability. This data centralisation saved the internal auditors time and effort. With the huge branch network and its expansion, it was extremely difficult to control, monitor and audit without centralised systems. The ERP system eliminated the need to transfer, reenter or duplicate data. The CIA supported that:

> The internal control is improved through having more centralisation. Efficient centralisation should be based on technology such as the ERP system. Having the ERP system that shows you in your screen all the numbers related to bank transactions, means better governance. The ERP system offered faster auditing screens that provide centralised access to all needed information without making physical visits. (Chief internal auditor)

9.3.3 Continuous Timely Monitoring

Having integrated systems offered better automatic monitoring and control in real time. The ERP system is a main tool which helped in monitoring bank departments and branches. The ERP system communicates in real-time and update information that is considered very important for a better control environment. The ERP system established

communication lines and provided updated performance data regarding operational and financial performance based on the inherent integration and automation. The integration and automation provided by the ERP system offered real-time information and control. The real-time information gave internal auditors more transparency that helped in internal control assurance, as an IT manager stated that:

> One of the important motivations to implement the ERP system was the need for real-time information that helps in fast reaction… The ERP system provides timely and relevant information. (Head of the IT department)

> Having integrated systems that show all the numbers related to bank transactions means better governance. This means better automatic monitoring and control on real-time. Without the ERP system, this couldn't take place; therefore the ERP system is considered a governance tool. IAF has open access to whatever needed data for audit purposes. We can access live transactions while taking place on the systems or run quires on the systems to view history. (Chief internal auditor)

9.3.4 Data Consistency

The ERP systemenhanced the internal control system through communicating consistent information. Internal auditors were spending a lot of time to arrange the data gathered from different departments and branches in a consistent format in order to be analysed. The ERP system helped to make the information available, consistent, updated, accurate, detailed, organised and reliable. The ERP system helped ensuring that information remains structured and useful. The internal auditor stated that:

> The ERP system provided consistent data that easily to be analysed by any data analysis tool. The ERP system merged operational information with financial information in consistence way. The data consistency easily alert for unusual or suspicious data. This is critical when there is more than 100 branches with different departments all generating business data. (General internal auditor)

9.3.5 Data Security

The ERP system maintained high security standards and data availability. The ERP system was extensively tested and was ready to undergo security audits. The ERP system complies with high security standards and enhanced availability since maintenance could be performed without shutting down operations. The Oracle vendor stated that:

> The ERP system is international and certified systems which have strict security rules that prevent most of fraud opportunities through data manipulations. Data is secured through access control to data that define the data can be viewed or edited by a user. (Oracle vendor)

9.3.6 Integration

IB had stand-alone applications that were connected to the core-banking system. The ERP system integrated all applications in one system. IB integrated different modules of the ERP system with the core-banking systems and some internally developed systems. In the end, it became a fully integrated ERP system covering all back-office needs. The ERP system offered integration on functional and data levels. For IB, the integration was very important to facilitate internal controls and communication. All accounts are reflected into the integrated ERP financial module as it has the GL which contains all front-office or back-office transactions. The internal control improved through having integrated systems which enhanced information centralisation. To review internal control for a large number of branches, integrated systems were necessary. The ERP system ensured more efficient processes with fewer errors, through this integration.

> The ERP system integrated operations and information flows. The ERP system aimed to integrate all data and processes of the bank into a single, unified and easily manageable system… (IT auditor)

The integration offered by the ERP system was the most important feature for assuring a better governance environment. The integrated working environment with security profiles for every user preserved

confidentiality and consistency of data. The ERP system back-office systems integration with core-banking systems offered greater accuracy and transparency of data, resulting in more visibility and tightly controlled processes. The integration facilitated by the ERP system implementation gave the opportunity to implement and integrate query software for auditing purposes. The integration was considered very important for the IAF as supported by many.

> The ERP system facilitated integrating software especially designed to extract data needed for special audit purposes. These systems provided all information needed for anti-money laundering or terrorism financing prevention. If we don't have these systems, we weren't being able to do all queries needed for monitoring purposes. The ERP system provided the integrated infrastructure that helped in adding software for especial investigations. (Head of the operational risk and control department)

9.3.7 Multiple Methods of Control

The ERP system integrated the financial view with the operational view and offered many ways to control the same transactions. The ERP system imposed many check points in both the financial and operational reviews. IT auditors at the focus group emphasised that:

> The ERP system merged operational with financial controls. The ERP system enhanced the ability of applying two factors of authentication and two role controls… (IT auditor)

9.3.8 Preventive Controls

Internal control systems became stricter after implementing the ERP system as it became preventive rather than detective. The systems prevented users from accessing unauthorised areas and put limits on the number of transactions allowed. The authorisation, security and access controls in the systems were powerful preventive tools for a better internal control environment. The ERP system offered automatic controls that restrict the segregation of duties and access controls. Strict segregation of duties and access control give internal auditors the confidence in

the accounting figures reported from systems. The ERP system through managing users' accounts gave each employee the relevant authorisations and authentications. The senior internal auditor stated that:

> After the ERP system implementation, most of internal controls turned to be automated. Therefore, internal control became more preventive than detective…The most important control in the ERP system is the access controls that preserve the authorisation process and segregation of duties rules… (Senior financial internal auditor)

9.3.9 Standardisation

For IB that has many branches worldwide, the standardisation concept was not new; however, ERP standardised the back-office functions as all front-office functions were already standardised. These systems were implemented around all the banks in the group worldwide to standardise all processes. Standard business processes which are automatically controlled give the internal audit confidence about the internal control that the possibilities for fraud are reduced. Therefore, it was easier for internal auditors to monitor one unified way of doing a business process. Having standard processes made identifying exceptions easier. The IT auditors in the focus group asserted:

> IB as a big financial institution there was a need to standardise the process across the bank. Global cross-bank financial reporting of IB must be consistent and comparable. Therefore, having standard process was essential. The ERP system employed in our international group must be the same systems, at the same release level and implemented in the same way to get standard business process. (IT auditor)

9.3.10 Transparency and Visibility

Transparency of information is one of the main pillars of successful governance practice. Transparency of information through detailed disclosure of data was impossible without a common and consistent data source. The ERP system offered internal transparency on multi-organisational and managerial levels to enhance the accountability within

the IB. Internal transparency enhanced the internal control, monitoring and auditing. Information transparency offered by the ERP system directly enhanced the internal control through providing accountability, traceability and visibility. The integration offered by the ERP system offered internal auditors a full view of the data entered from different branches and departments by storing data in one integrated database with the ability to retrieve these data from different locations.

> The ERP system offered us internal transparency to view all needed data easily whether financial or operational. All governance problems were based on the non-availability of data; while now the ERP system offers unprecedented internal transparency. The ERP system gives options for internal auditors to trace all transactions. For example, these systems give options to know who signed on certain type of transactions during the last ten days. The ERP system offers the IAF great information transparency. IAF has open access to whatever needed data for audit purposes. (Senior financial internal auditor)

All these control assumptions of the ERP system are well recognised from the internal auditors' perspective; however, not all these assumptions are utilised. To utilise some of these assumptions, there was some effort needed to align the IT systems with the governance environment within IB and there had to be some adaptations from the IAF side.

9.4 Aligning Efforts Among ERP, Governance and IAF

The ERP system standardised the business processes to be in accordance with all internal policies and external rules and regulations. The ERP system runs business processes taking into consideration most of the governance goals. Moreover, most of the ERP system's assumptions of controlling the business enhanced the achievement of the governance objectives. The ERP system offered greater internal transparency, data accuracy and good internal control. The ERP system became an integral part of the governance process at IB. Therefore, both the ERP system and the governance have aligned complementary impacts on the IAF.

The ERP system improved the internal auditors' governance role. The ERP system made compliance, control and financial audit much easier. In supporting of this point, the compliance officer said:

> The ERP system never hinders any good internal control practice and the same local laws never hinder better control. These systems by nature are in alignment with most of governance roles especially in financial institutions whether national or international. The ERP system is considered as an effective corporate governance tool. The ERP system reflects all laws and regulations whether national, international or internal regulations. (Head of the compliance department)

Although the ERP system is in alignment with governance objectives, there were some views taken into consideration during the implementation to maintain this alignment.

9.4.1 Change Management

Before implementing the ERP system, IB set all the requirements; prepared a well-qualified project management team; and put in a change management plan. It was very important for all to get very extensive training prior to implementing such important systems that continued in the form of continuous training. The top management at IB gave much attention to the change management process during the ERP system implementation, especially the adaptations needed in the IAF in order to add value. Not only the IAF change was planned as an important part of the whole change management plan during the ERP system implementation, but also the internal audit was considered as a key enabler for change initiatives. This approach was mentioned in the interviews; the IT consultant stated that:

> The internal auditors were on the top of any change take place within the bank to refresh their knowledge about the business processes, otherwise they will audit based on old process that has been changed. (IT consultant)

> Group Audit conducted analysis to identify: Areas that were not previously covered in the audit scope, Areas previously included in audit programs that will require more detailed review. Controls included in the

ERP system were compared to these expected to define the scope of the upcoming audits. (Chief internal auditor)

9.4.2 Reengineering and Customisation

At IB, the ERP system implementation did not initiate much business processes reengineering. IB has a software delivery team that was responsible for customising and configuring new systems before being implemented. Most of the configurations in the ERP system that were recommended by the internal IT auditors were related to the segregation of duties and reporting area. However, configurations were limited by the cost of doing them. The implemented systems in IB Egypt were the same systems which were applied in IB worldwide; however, sometimes there were some differences to the systems as a response to the national requirements.

For the banking sector, it is very difficult to reengineer the business processes; therefore, IB bank had to do some adaptations to the systems. For example, according to the systems default settings in some areas, the processes do not require a checker to review the maker's work; however, banking practice does not allow passing any transaction without it being checked by another party. In these situations, there were two options, either the system had to be configured to add the further step needed or to try to work around the system to satisfy working needs. In both cases, the involvement of the IAF was very important in order for them to be aware of all modifications which might be auditable.

9.4.3 Internal Auditors' Involvement in ERP Implementation

The need to be objective did not exclude the possibility that management may request from the IAF an opinion on specific matters related to the internal control. For the sake of efficiency, an opinion was requested when considering new establishments that carry out risky activities and the important reorganisation of control systems or IT systems. At IB, the internal auditors recognised and raised the importance of implementing the ERP system before it was decided to implement

such systems. The auditors were involved in the process of choosing the modules and choosing the appropriate vendor.

At IB, the IAF was a very effective function. Therefore, the internal auditors were involved in the ERP system implementation from the early stages. Internal auditors add value through helping the IT team to assure that the business processes going through the systems are in compliance with the function and business instructions manuals. Internal auditors with the IT security officer and IT auditors were involved in many stages of the implementation to check that the required level of control was available in the systems. They were involved in user management to give each employee the relevant authorisations and authentications. The internal auditors' involvement was essential in the different implementation stages. The control and risk manager said:

> Internal auditors were involved from the very early stages. They were involved in all details to review the sufficiency of controls applied into the systems and to review all new procedures applied into the systems… Internal auditors add value through the implementation stage by highlighting areas that should be enhanced… (Head of the operational risk and control department)

Internal auditors were interested in the segregation of duties and to assure that the business process is auditable. They were involved in putting their requirements for the reports and the type of information they needed in each report. Internal auditors' involvement in the implementation saved time and effort in revising the systems after going live. Most of the control risks were mitigated during the implementation through involving internal auditors in the team. Internal auditors were considered as super users. They learned how to make the best use of these systems and how these systems affect their practice. The involvement of the IAF was very important in order to be aware of all modifications. The internal auditors were doing a sort of consultancy during the different implementation stages. IT auditors had an essential role during the implementation; however, some of the financial internal auditors were involved and interested in users' interaction with the systems. Internal auditors would be aware of the documentation of all

processes through the systems in order to be audited. The IT consultant said:

> For sure internal audit team is always being involved in any systems' implementations or developments. The IAF is not responsible for determining the way to perform, but it is responsible for assuring that what already agreed upon in the function instruction manual (FIM) and business instructions manual (BIM) is done. (IT consultant)

> They were involved with the super users as they are considered as extra super users, to assure the implementation of the segregation of duties. They were involved in the data migration process to verify that all data were transferred correctly. They were involved in assuring and understanding the internal control logics through the new systems. Internal auditors check the CAVAIR role. That is data should be Complete, Accurate, Valid, there is Restricted Access on data. (IT auditor)

As part of the change management process and based on the role played by the internal auditors in the implementation stages, there was a need to change some aspects of the IAF's structure and practice to maintain its legitimacy.

9.5 The IAF Adaptation

The changes in the IAF as a result of the ERP system introduction were very difficult to quantify as the value added of this function has not been reported. Therefore, each aspect of the IAF practice and structure was investigated and explored after the ERP system implementation.

9.5.1 Scope of Services and Practice

The ERP system replaced and consolidated many auditors' tasks. The ERP system reduced the time needed to perform any mission with the minimum examination sample. Having standard and integrated systems made the IAF tasks easier. Although the IAF at IB was very well

developed and added value by doing financial, compliance and operational audits, the ERP system helped in improving and expanding all types of audit. The role of internal auditors evolved and the scope of audits expanded after the ERP system implementation to cover all activities of the bank and to encompass the assurance of internal controls including IT controls and the ERP system management. As supported by many, an internal auditor stated that:

> The ERP system has an impact on each type of auditing. For operational audit, most of operations are now related to the ERP system; therefore in order to review the efficiency and effectiveness of each process all needed data are retrieved from ERP that offer the link between all operations and their financial impact. For the financial audit, all financial records and trail balance are produced by ERP. Therefore, we can depend on the trail balance without testing whether it is well-prepared or not. For the compliance audit, the ERP system absorbs all guidance, rules, and laws that we should abide with and impose them on all the business processes. (General internal auditor)

The internal audit at IB evolved to meet the more pressing needs of business process optimisation. It involved the review of all financial and non-financial operations and information either manual or computerised. The ERP system merged into the business process and ran most of the business processes; therefore, they could not be audited or its outcomes audited separately or their impact isolated from the financial, operational or compliance audit. Therefore, the ERP system implementation increased the importance of the IT auditors within the internal audit team.

One financial and IT-integrated audit plan determines the applications that affect the financial figures and which application should be audited according to the scope of the financial audit. Internal auditors review all operations and ensure that all rules are implemented and all procedures are followed according to the bank's manuals. They review all accounting processes; review the module used in each department; check whether any error messages appear and internal controls within the systems run properly and segregation of duties; check that

the users do the transaction and the screen does not proceed until getting approval and validation; review the employees' profile and assure that it is compatible with the access rights they have; review the levels of authority for users according to their job descriptions; review the integration among different modules and systems especially between the core-banking system and the ERP system to ensure that there is no data loss. Evidence for these requirements was found through interviews and job descriptions.

> Any mission is performed through five internal auditors with one IT auditor. IT auditors are assuring that all reports generated by all systems are sufficient for the internal auditing purposes. IT auditors always support the other audit team members if there is any piece of information needed or especial kind of reports. These mean that although we are in one internal audit team, IT auditors have scope focusing on systems applications while other internal auditors focus on accounting figures, rules and operations. When the financial auditor use automated report produced by the systems and want to check the correctness of certain calculation done by the systems, then we do something called black-box test. We run some fake data to assure the rightness of the processes going through the systems. Moreover, all types of audits require reliance about the automated controls running into the systems. The IT auditors are reviewing and auditing applications based on an agreement with the financial auditors in our integrated audit plan. (IT auditor)

All internal audit team members were experts in the business and gave consultancy advice besides their normal recommendations even before the ERP system implementation. However, the ERP system saved the time of the internal auditors to offer more consultancy activities and offer them a better and clearer view of all integrated information within the bank.

9.5.2 The Structure of the IAF

Having a balanced internal audit team was crucial to support an integrated business working environment at IB. There was a need to have

an integrated internal audit team that is able to do across functions audit. There was a need for a specialised audit team who could communicate with the auditees in each department. Therefore, the internal audit team became an integrated audit team that gathers together general auditors, auditors specialised in each specific business process and an IT-specialised auditor in each module to support both types of audit. The general audits were interested in the general reviewing governance and control procedures. The specialised audits were interested in the details about processes and the way of practising. IT auditors collaborated with each group in the technological part. Participants and documents confirmed this structure.

> The internal auditors in IB are qualified and experienced and they seized the ERP system implementation as an opportunity to change their team structure. The internal audit team became integrated with IT auditors and some other experiences. Integrated business process based on fully integrated systems required fully integrated internal audit team to cover all business processes. (Senior financial internal auditor)

After the ERP system implementation, the IT audit gained unprecedented attention. IT auditors became an integrated part of the audit team as they are involved in most types of auditing. They were considered as supporters and facilitators for the whole internal audit process whether financial, compliance or operational. An internal auditor stated that:

> "IT auditors are responsible for preparing for all other types of audits. IT internal auditors review all automated internal controls to give us the green light to depend on all reports resulted from the systems."…"Having IT auditors who go into missions hand in hand with internal auditors enhance the learning process for the traditional internal auditors to get the needed IT and IS skills. IT auditors facilitate the other auditors' job." (IT auditors)

The concept of an integrated internal audit team was introduced with the integrated core-banking system that was implemented at the bank before the ERP system. The need for the IT auditing and the different auditing experiences appeared. The bank had many auditing specialities

such as IT, credit, customer services and risk auditing. After the ERP system implementation, all the bank operations become integrated whether front- or back-office banking operations. Therefore, the integrated internal audit team became a must. It was preferable to have auditors who have professional qualifications and were younger. This trend drove sweeping changes that required redefining the auditing departmental outlines and pursued a unified value proposition of internal auditing so that they were recognised as a strategic governance player.

9.5.3 Internal Auditors Skills

Internal auditors were required by their professional standards to possess the knowledge, skills and technical proficiency essential to the performance of internal audits; to be skilled in dealing with people and in communicating audit issues; and to maintain their technical competence. As IAF was considered a very important function within IB that complies with professional standards, having a well-skilled internal audit team was important. There was a much attention given to the skills of the audit team at IB.

> In accordance with our Group Audit, every auditor is required to complete at least 40 hours of training per year. This can include internal or external training courses, online or computer based training or self-study in preparation of an approved professional certification. The existing processes ensure that adequate qualified staffing of the audit function is provided. (Chief internal auditor)

One of the new skills that internal auditors gained after the ERP system implementation was to be flexible and accept evidence in any format. Even IT auditors started gaining skills related to each ERP module. The IT consultant stated that:

> Internal auditors became flexible to accept the evidence presented to them even it take new unusual format. Internal auditors are always updated to be aware of any kind of change taking place within the bank. Otherwise their knowledge will become obsolete. The ERP system implementation

> enforces internal auditors to increase their knowledge in the IT and IS areas besides the normal awareness with the ERP system. (IT consultant)

Implementing the ERP system did not much affect the skills in the audit team. Moreover, having integrated internal audits team highlighted the importance of having specialised internal auditors in many areas rather than adding more skills to the same auditors.

9.5.4 Internal Auditing Tools

The ERP system was considered as a governance tool that offered essential support to the IAF. Therefore, the internal auditors at IB made the best use of the systems. The IAF at IB utilised the latest audit methodologies and related IT-based solutions. The internal audit used the latest audit technology for planning, testing and reporting. Before ERP implementation, IB used ACL software and some other auditing software that was specially designed by the group. Communication and reporting tools integrated all audit issues, findings, recommendations and execution updates in an audit database to be referred to for future learning and to follow on the execution of the audit recommendations. Therefore, there was no need to introduce special financial or IT audit software. Internal auditors now utilise all features of the ERP system to do queries and investigate certain events to facilitate and improve audit effectiveness. The ERP system was the main tools that help in assuming control responsibilities. An internal auditor stated:

> We have audit software to generate reports, interface with all other departments, and follow up with recommendations. We now depend more on the data analysis tools… We use special auditing software before even implementing the ERP system. We integrated our auditing software with the ERP system. (General internal auditor)

9.5.5 The IAF Sourcing

IB had all the required experience in house to do all types of auditing. Therefore, there was no need to even partly outsource the IAF. The

concept of IAF outsourcing was not accepted in the IB group as any required specialist can be provided by the audit group. Other banks which did not have qualified internal auditors had to outsource the IT auditing to external parties, while IB has all the required experience already.

9.5.6 Internal Auditors' Relationship with IT Department

The ERP system implementation strengthened the working relationship between the IAF and the IT team. The automation and integration came with the ERP system increased the correlation between IA team and the IT team. Internal auditors had a query access to all transactions through ERP packages; however, the IT team can access all data in the database through advanced data mining tools. This means that the IT team can access more data than the internal auditors can. Moreover, audit and control functions collaborate with the IT team in making tailored systems to help them in their monitoring role. The systems analyst was responsible for assuring that the ERP system satisfies business and audit requirements or to add other software. The internal controller said:

> With the ERP system implementation, there is no manual based work whether for monitoring or queries. All communications are based on electronic documents. All the time we and auditors are dealing with IT team. They are enabling us to perform special queries or extracting certain data for controlling or auditing reviews. IT team is not determining the data we can access, IT team is enabler. (Head of the operational risk and control department)

9.5.7 The Size of the Internal Audit Team

The internal audit department size increased slightly because of incorporating new individuals with new experience. Although the ERP system implementation saved the time and effort of the internal auditors and made the IAF easier, there was a need to make an integrated internal audit team that gathers diverse experience; therefore, the internal audit

team has increased. In particular, the size of the internal audit team has increased by adding more IT auditors. It is important to mention that the ERP system implementation was a result of business expansion; therefore, the size of the IAF could be increased because of the expansion. However, the increase which resulted from incorporating new experts was related to the ERP system implementation.

9.5.8 The IAF Budget

Though there was an increase in the IAF's size and scope, its budget decreased slightly with the ERP system implementation. Making the best use of the ERP system features in controlling and monitoring business processes and through having an integrated and balanced internal audit team saved a substantial part of the audit budget. The head of the IT audit team stated:

> The budget of the IAF has decreased. Having IT auditors reduced the number of the financial auditors needed. Instead of making internal audit team of 30 it can be 15 and 3 IT auditors. Therefore, the IAF budget salaries decreased and many other expenses of doing the audit missions decreased as well. (Head of the IT audit team)

9.5.9 Internal Auditors' Relationship with the External Auditor

At IB, there was already trust between the external auditors and the internal auditors. Therefore, the ERP system implementation did not change the well-established working relationship, confidence and respect with the external auditors. External auditors started with the internal audit plan to review what was covered and identify the risky areas. The external auditor said that:

> We always depend on the results and reports of the IAF as we are sure that they are a very strong and developed IAF. We ask for detailed assurances about the workings of the ERP system. The ERP system

implementation didn't change the relationship between the IAF and the external audit; however these systems helped us in our missions. (External auditor)

9.5.10 The IAF Strategic Response

The ERP system facilitated the IAF; therefore, all internal auditors were excited to use and learn about these systems. The internal auditors decided to adapt to the new requirements and consider it as following the international guidelines and standards. The internal auditors adopted imitation tactics-acquiescence strategy as they did not resist the project. They communicated with other successful associates in the group and adopted a similar position and followed the approach used by successful audit managers in other banks in the group. The ERP system became part of the business process, and no one could avoid using it. The ERP system was the source of the data for the IAF; therefore, if internal auditors did not get the data from these systems, they would not be able to access it somewhere else.

Using the same consulting company facilitated copying the internal audit model successfully from other IB locations which had already implemented ERPs. The approach of IB at the global level was to have the same requirement for the IAF in all locations. The involvement of the internal auditors in the implementation decision and process motivated them to understand and accept all new assumptions of the ERP system in controlling the business. Internal auditors considered the ERP system as a tool to help them improve their function. Moreover, the constant change at IB became a habit for internal auditors as the banks were keen to implement whatever was considered as an improvement in the auditing area. Many interviewees supported this.

We learned from the successful internal audit models after ERP implementations in other banks in the group of in our region through the professional networks within the group. Therefore, all internal auditors accepted the ERP system and changed whatever routine to make the best use of these systems. They seized the ERP system implementation as an opportunity to change their team structure. They were very ambitious to

> improve their knowledge about these systems. The internal audit team is very fixable and open minded. We face change very frequently in this bank. Therefore, we get used to adapt with change. (Senior financial internal auditor)

9.6 IAF Legitimacy After ERP Implementation

From the managerial perspective, legitimacy is grounded in assessments of stakeholder relations. The internal auditors deployed symbols in order to garner societal support. One of the legitimacy-maintenance strategies that were used by the internal auditors was to focus on enhancing the ability to foresee emerging challenges from the ERP system implementation. These efforts reduced the legitimacy threat which came with the ERP system implantation. In addition to guarding against challenges, they sought to buttress the legitimacy they had already acquired. The IAF at IB already acquired moral legitimacy as a governance tool that helps in risk assessment and internal control assurance. This is consistent with the international trends, according to which the IAF derives its legitimacy from pursuing a new role in control, risk management and governance (IIA 1999; Spira and Page 2003). This was achieved by aligning with prevailing normative prescriptions, thus giving moral legitimacy and by asserting their functional superiority as pragmatic legitimacy. More research is needed to judge whether these adaptations become taken for granted as the natural and appropriate arrangement of adoption provides cognitive legitimacy.

9.6.1 Ability of the IAF to Provide Control Assurance

Internal auditors proved that they were able to provide proper assurance about the efficiency of the internal control systems within IB even after the ERP system implementation. The ERP system was considered as internal control tools by the internal auditors that improve their service regarding internal control assurance. There was a collaboration between IT internal auditors and financial auditors regarding the assurance

of the automated controls. Internal auditors fully understood all controls applied within the bank as they are accountable before the board of directors regarding assuring all types of control. The IAF role was to independently evaluate other controlling functions such as operational risk, IT and internal control functions. The CIA confirmed that:

> The IAF as a team collectively is accountable for evaluating controls even these embedded in ERP applications such as testing the interfaces between systems; reviewing audit logs of transaction processing; testing the accuracy and validity of data in databases; reviewing and testing access controls to applications, databases and networks… The control structure is complemented by independent and periodic reviews by our IAF. (Chief internal auditor)

9.6.2 The IAF Ability to Support Risk Management

The ERP system implementation was a well-planned project; therefore, there were few new operational risks after implementing the ERP system. The IAF prepared a risk map to classify risks from high to low on different areas within the bank. Internal auditing was risk based; therefore, the audit plan was drawn according to the risk map. The scope of audits was based on the internal audit's assessment of risks. The scheduling of audits was a dynamic process reflecting changes in internal audit's assessment of risks. Evidence was found for the ability of the internal auditors to support the risk management process; for example, an internal auditor stated that:

> We review risk factors and control environment in each department and focus on any changes in the process, IT or in the ERP system. Each process objectives are reviewed against risks that hinder achieving these objectives and check the controls that mitigate these risks. (General internal auditor)

Any change especially in IS was observed by the internal audit until everything had settled down. The highest risk was the access control and the changes in these rights according to the employees' movements

among departments. The IAF took into consideration all these risks related to the ERP system. Moreover, the changes in the IAF structure and practice were aligned with the new working environment. Therefore, the IAF foresaw emerging challenges from the ERP system implementation.

9.6.3 The IAF Importance After Implementing ERP

The audit committee relied heavily on the IAF for providing assurance and examining the effectiveness and efficiency of functions. The IAF had free unrestricted access to all types of the data, records and personnel within the bank. The IAF was considered as a very important function that was highly appreciated by all types of stakeholders as observed by the researchers from their prestige within IB. Any kind of support needed by the IAF is directly provided. An internal auditor stated:

> The IAF satisfy all stakeholders' needs. The national management can't interfere in the IAF as we are reporting directly to the board out of Egypt. The importance of the IAF in our bank is highly appreciated by all types of the stakeholders whether they are board of directors, audit committee or group audit. I am totally happy with the IAF in IB. The IAF is different in focus and in reports it delivers. The IAF in IB doesn't report only about deficiencies, but also about advantages. The IAF in our bank is considered as the most important tool to support the audit committee and the board of directors. The IAF is the main generator for change and improvement in our bank. (General internal auditor)

Implementing the ERP system did not affect the appreciation of the IAF from the board of directors' side. The internal auditors succeeded at IB to preserve a very good image for their profession. They reduced the gap between their desired and perceived professional images. Internal auditors were capable of meeting the technical and social demands of their function. The internal auditing professional image at IB was shaped by personal values and societal expectations. Internal auditors tried to improve the IAF position within IB and spread the advisory role it plays to help individuals to accept their notes. It was the function

that aims to help employees improve their performance through finding opportunities for improvement. The IAF aimed at process enhancement to mitigate any possible risks and to achieve IB objectives and even more.

9.7 Conclusion of Case Study 4

IB was subject to comply with the requirements of the international governance requirements that directed the bank to apply a risk-based IAF. The IAF was governed by the IB group audit standards, policies and procedures, which were based on the international standards for internal auditing and Basel recommendation. IB supported the normative pressures and enforced their implementation through incorporating them into the formalised manual requiring compliance to the national or the international regulations whichever were stricter. These coercive and normative pressures determined that the IAF should be able to provide control assurance and risk management in order to be legitimate. All internal auditors at IB Egypt look to having a successful IAF through the international professional audit network and through their relations at the big audit companies.

The ERP system changed the risk-control landscape within IB to a better one. The business process which is automatically controlled gave the internal audit confidence about the internal controls and decreased fraud possibilities by a significant amount. The automation brought with the ERP system encouraged the IAF to change the communication of audit results and reports to be mostly automated. All the control assumptions of the ERP system are well recognised from the internal auditors' perspective.

The ERP system was implemented to be an integral part of the governance process at IB. Not only the IAF change was planned as an important part of the whole change management plan during the ERP system implementation, but also the internal audit was considered as a key enabler for change initiatives. The involvement of the IAF was very important in order to ensure that all modifications were auditable.

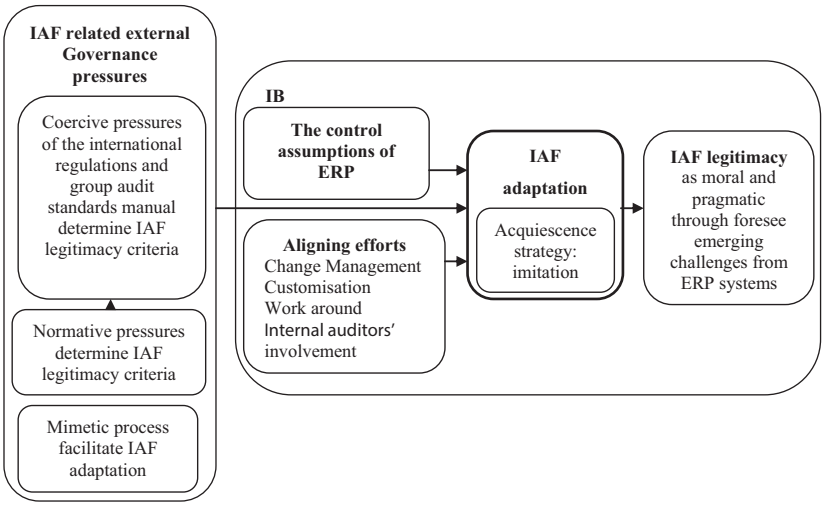
IAF related external Governance pressures
Coercive pressures of the international regulations and group audit standards manual determine IAF legitimacy criteria
Normative pressures determine IAF legitimacy criteria
Mimetic process facilitate IAF adaptation
IB
The control assumptions of ERP
Aligning efforts
Change Management
Customisation
Work around
Internal auditors' involvement
IAF adaptation
Acquiescence strategy: imitation
IAF legitimacy as moral and pragmatic through foresee emerging challenges from ERP systems

Fig. 9.1 Case study 4—summary of main findings

The ERP system replaced and consolidated many auditors' tasks. The role of internal auditors evolved, and the scope of audits expanded after the ERP system implementation to cover all activities of the bank and to encompass the assurance of internal controls including IT controls and the ERP system management. The ERP system implementation increased the importance of the IT auditors within the internal audit team. The internal audit team became an integrated audit team that gather general auditors, auditors specialised in each specific business process and an IT-specialised auditor in each module to support both types of audit.

All internal auditors were excited to learn about and use these systems. The internal auditors decided to adapt to ERP requirements considering this as following international guidelines and standards. The internal auditors adopted an acquiescence strategy through imitation tactics. The internal auditors considered the ERP system as a tool that helped them enhance their function. One of the legitimacy-maintenance strategies was to foresee emerging challenges from ERP systems implementation. The IAF at IB already acquired legitimacy as a governance tool that helps in risk assessment and internal control assurance

consistent with the international trends to legitimate the IAF, thus giving moral legitimacy and by asserting their functional superiority as pragmatic legitimacy. These main conceptual findings are summarised in Fig. 9.1.

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10

Cross-Case Analysis and Discussion

10.1 Introduction

While the previous chapter presented data gathered from the individual case studies, this chapter presents the findings of the cross-case analysis in order to develop a solid and a more comprehensive understanding. The applied cross-case analysis techniques are proposed by Eisenhardt 1989; Miles and Huberman 1994; Yin 2009 where data were analysed using a certain lens to do a structured analysis to understand the similarities and differences between cases as explained in Chap. 4. To do so, the comparison is based on the institutional theoretical framework, which was formulated in Chap. 3. The emergent concepts, themes and factors are highlighted and discussed.

The aim of this discussion is to delineate and discuss the differences and similarities among the cases regarding the investigated constructs of the key corporate governance pressures; the control assumptions of ERP systems as perceived by participants in each case; the IAF changes as responses to these pressures and assumptions and the reasons behind adopting these responses. Therefore, the aim of studying multiple cases is to compare outcomes across cases in order to develop more powerful

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explanations through understanding how outcomes are qualified by contextual conditions.

10.2 IAF-Related Governance External Pressures

Although the four case organisations work in the Egyptian governance environment and are affected by similar governance pressures, there were some differences among the cases as they belong to two different sectors and two of them are national and two are international. Therefore, the institutional lens does not focus on the organisational field level of analysis; however, it goes deeper to specific organisational and sub-organisational levels as a unit of analysis. This is because the organisational field level comprises several organisations or industries which could be unrelated in some ways and which adopt different institutional norms. Therefore, there were differences in the external pressures between cases, although they are located in the Egyptian organisational field each organisation and its IAF, as a sub-organisation unit, have some specific governance pressures.

10.2.1 IAF-Related Coercive Pressures

The IAF-related coercive pressures were very weak in Egypt; therefore, it was voluntary to maintain an adapted IAF. However, the banking sector had more rules that govern the business. The legal framework that regulates auditing practice in the Egyptian banking sector had no rules directly related to the IAF; however, there was emphasis on having an internal inspection department. This means keeping the traditional concept of errors reporting that does not add value. The executive regulations of the banking law implicitly determined the responsibilities of the IAF to include reporting on the adequacy of the internal control systems.

The mixture of using audit and inspection terms caused confusion at NB as there was no clear understanding about different roles. The IAF is a consulting activity that evaluates and improves as an advisory service, whereas inspecting only provides error finding reports. Therefore, auditors at NB consider themselves as inspectors, detectors or policemen who

are responsible merely for reporting errors. Preserving this concept after the ERP system implementation has legitimated the IAF adaptation.

The central bank of Egypt issued a manual about the control policies that should be followed by all banks. It implicitly highlighted that the IAF has a role to play in reviewing the sufficiency of internal controls including the computerised IS controls and asked the audit committee to review the availability of qualified personnel in the internal audit department. However, bank supervision in Egypt is hampered by limitations. The significant increase in the number of banks has not been met by an equivalent increase in the staff, capacity or resources of the central bank of Egypt's control department, resulting in insufficient monitoring (e.g. El-Shazly 2001).

IC and IB were subject to some other rules and regulations of other countries as they are listed on international stock markets. They are listed at NYSE and must maintain an IAF. They had to comply with SOX (2002) and the UK Combined Code of corporate governance (2010), where the importance of the IAF was emphasised. These pressures encourage keeping an IAF that is more risk based.

Pressures of the head office control upon group subsidiaries have been recognised by institutional researchers as a form of coercive pressure (Fligstein 1990). Internal rules and principles that determine the responsibilities constitute coercive pressures on the sub-organisational groups. For IC and IB, these pressures were strong to have well-defined auditing practice and structure. Internal policies took into consideration the requirements of the national or the international regulations whichever were stricter. These pressures from the head office or the group regulations emphasised the impact of the international regulations and even the international auditing normative standards on the top management in Egypt. At NC and NB, it is an oral working environment wherein dependence was on the traditional inspection practice. There were no written policies, and where there were some available, they were not applied, and no one was aware of their existence.

Other type of pressures came from the external audit management letter, where the external auditors highlighted the importance of having an adapted IAF especially after the change occurred with the ERP system implementation, at NC. There was no active audit committee

at NC; consequently, there was insufficient support for IAF adaptation or response to the issues that were highlighted in the management letter.

In sum, coercive pressures, when they existed, determined the most important activities for the IAF, which gave it legitimacy as an effective governance tool. It was demonstrated that there was an impact of the institutional pressures on the adaptation of the IAF that was stronger when imposing sanctions. As a result, there is an unimportant IAF at NC, while there was an inspection department at NB and, in contrast, there was an important risk-based IAF at IB and IC.

10.2.2 IAF-Related Normative Pressures

These pressures depend on values and norms as the basis of social obligation. Most of the values and norms in Egypt supported the traditional view of the IAF, where the internal auditor is a watchdog or an inspector. The internal audit profession is still less mature in Egypt and has not been fully recognised as a specialised profession. Internal auditors collectively struggle to define the conditions and methods of their work, set up a cognitive basis and seek legitimacy. Most forms of internal auditing professionalisation such as formal education or professional networks are weak in Egypt, where new models of modern IAF were difficult to emerge.

Egyptian auditing standards dealt only with the reporting issues and ignored internal auditing, and there was no any separate code applicable for internal auditing. There is not any Egyptian professional institution to support the IAF or issue standards other than the ESAA, which does not ensure compliance with rules of professional conduct. Although there is an IIA chapter in Egypt as a professional body to govern this profession, it has had a minor role. Moreover, the quality of auditing education suffered from a lack of a modern syllabus and lack of resources for students.

These characteristics of the internal audit environment mean that internal audit practice could significantly vary among organisations in Egypt. Therefore, the normative pressures at NC and NB had a negative impact on improving the IAF. This was because of the weak professional

and educational environment. Moreover, the majority of internal auditors in these cases were not Certified Internal Auditors or even professionally qualified accountants.

At IC and IB, the majority of internal auditors were Certified Internal Auditors and came from the big four audit companies. They complied with the group rules and internal policies, which were mainly based on most of the professional standards. These standards emphasised the ultimate goal of the IAF which is to add value through taking an effective role in supporting risk management and internal control assurance. They encouraged gaining the suitable skills and having sufficient knowledge of key IT risks and controls; evaluating risk exposure relating to ISs; and using the appropriate technological tools. IC and IB turned normative pressures into coercive pressures through incorporating these standards in the formal internal policies. The greatest support for the normative professional pressures was the sound internal audit professional group network.

10.2.3 IAF-Related Mimetic Pressure

In all cases, ERP systems implementation created uncertainty in the working environment for the internal auditors. At IC, the internal auditors and the management tried to copy a successful IAF model of the head office and subsidiaries in the same region, which had already implemented SAP. At IB, the CIA looked to the successful IAF outside Egypt through their relationships at the big four audit companies. In both cases, the use of the same implementation consultant which had been used by other organisations in the same group to implement ERP systems outside Egypt and the strong professional audit network facilitated the mimetic process for adaptation.

At NB, the working environment was characterised by uncertainty and there was only a vague conception of the proper IAF that increased with the ERP implementation. Therefore, there was a tendency to stick with the traditional concept of inspection. Being an inspector was an accepted role of the internal audit department. At NC, the absence of guidance regarding IAF practice resulted in shared misconceptions

Table 10.1 Governance institutional pressures matrix

		Case study 1 IC	Case study 2 NC	Case study 3 NB	Case study 4 IB
Coercive governance institutional pressures related to the IAF	**Egyptian regulations**	Not required to have an IAF	Not required to have an IAF	Not required to have an IAF, but must have an inspection department Causes confusion between internal inspection and internal audit	Not required to have an IAF, but must have an inspection department
	Supervisory	None	None	Central bank of Egypt and Central Auditing Agency	Central bank of Egypt
	International regulations	SOX, NYSE and UK CG Code Lead to risk-based audit	None	None	SOX and NYSE and UK CG code Lead to risk- based audit
	Head office policies	Code of ethics, Code of business principles, compliance manual, risk management policy, accounting and reporting policy	Oral working environment without written policies	Working environment depends on the traditional organisational experience	Internal Policies and Group Audit Standards Manual
	External auditor	None	The management letter highlights the IAF need for improvement	The management letter highlights the IAF need for improvement	None

(Continued)

Table 10.1 (Continued)

		Case study 1 IC	Case study 2 NC	Case study 3 NB	Case study 4 IB
Normative	**Professional network**	IIA encourages gaining sufficient knowledge of key IT risks and controls; evaluating risk exposures relating to ISs; using the appropriate tools; and ensuring the availability of the sufficient resource to achieve goals Group IA professional network to share new developments	Egyptian Society of Accountants and Auditors No Egyptian standards and the Society does not ensure compliance. Keep the traditional concept of watchdog	Egyptian Society of Accountants and Auditors and EBI No Egyptian standards and the Society does not ensure compliance Keep the traditional concept of watchdog and inspector	IIA and Basel encourage gaining sufficient knowledge of key IT risks and controls; evaluating risk exposures relating to ISs; using the appropriate tools; and ensuring the availability of the sufficient resource to achieve goals. Group IA professional network to share new developments
	Formal education	Company enhances internal auditors' capabilities through encouraging continuous education	Education deficiencies keep the traditional concept	Education deficiencies keep the traditional concept	The bank enhances internal auditors' capabilities through encouraging continuous education
Mimetic	**Copy successful model**	There were successful IAF change models to copy from the head office and other subsidiaries	There was no successful model to be adopted	Stuck to the accepted IAF model of the central bank of Egypt as inspectors	There were successful IAF change models to copy from the group audit network and relations with the Big 4 audit companies

about the acceptability of a weak role for the IAF. Therefore, mimetic process explains the common theme that internal audit is not an important function. However, companies tend to imitate other successful models to avoid being different; there was no clearly successful model of the IAF to be followed other than the traditional common one. Therefore, NC discarded the IAF and kept only one auditor as a symbol of having an IAF after the ERP system implementation.

Table 10.1 shows the Institutional Pressures Matrix, which displays and summarises the important observations of the comparisons related to the governance coercive, normative and mimetic pressures related to the IAF.

10.3 Control Assumptions of ERP

It has been confirmed through the multiple cases that ERP systems if implemented and used properly, can significantly improve the internal control system. The main difference was that, for IC and NC, the ERP system controls the processes of the whole business, while for NB and IB they worked as back-office systems and offered tight control on the activities other than the core-banking business processes. The assumptions behind the ERP-embedded logic of control translated in each context were investigated. The contents of technology reflect peoples' cognitive assumptions about the meanings and expectations of a particular technology (Orlikowski and Gash 1994). Therefore, data codes identify the meanings and expectations that different groups expressed about the assumptions behind the control logic of ERP systems.

10.3.1 Automation

ERP systems offered automatic and systematic controls that reduced human intervention errors. The clear difference among cases was that when the accuracy and availability of information are at a low level such as at NC and NB, the importance of having automated and

documented processes increased more than focusing on improving the business processes or developing other areas such as the IAF. However, this automation raised the importance of automating some of the auditing activities at IC and IB. Automation provided by ERP systems implementation resulted in preventive control and continuous monitoring and reduced the effort of the internal auditors in doing routine work and non-value-adding tasks.

10.3.2 Centralisation

Using a centralised database minimised data redundancy and the divergence in values from one system to another when using the same data. This centralisation opened the possibility of a deeper level of controllability to activities that had been partially opaque. The evidence supported that centralisation was more important at NB and IB as bank branches are spread around the country more than IC and NC. ERP systems offered faster auditing tools through screens that provide centralised access to all needed information without physical visits.

10.3.3 Continuous Timely Monitoring

In all cases, ERP systems improved the internal control structure based on offering the ability to continuously monitor information flow and users' activities. The integration, automation, real-time data sharing and multi-path query for internal control offered by ERP systems facilitate real-time control, continuous monitoring and improved internal controls through periodic, ad hoc, exceptional or specialised reports. The evidence showed in all the cases that ERP systems increase the interdependability of work processes and increase the importance of peer reviewing as a way for continuous monitoring. Whenever the IAF was weak and did not utilise these facilities, other parties especially IT personnel took over many auditing tasks and built upon these features to enhance their position at NC and NB.

10.3.4 Data Consistency

ERP systems made data consistent through standardising business processes and unifying the whole data process. ERP systems' standardisation of business process resulted in all data being consistent among all branches and departments. AIS became based on event-driven business data. ERP systems offered data consistency through offering data integration instead of data redundancy by having scattered data in numerous systems and documents. The evidence in the cases showed that the importance of having consistent financial and non-financial information was higher at IC and NC as trading companies than in banks like IB and NB.

10.3.5 Data Security

One of the most emphasised assumptions of ERP shown in the cases was its automated data and functions security. Considering data security as a component of the internal control system was a new concept for internal auditors; however, data security's impact on the internal control system was appreciated by internal auditors. Auditors' main concern was the security of financial data because when data security processes are missing, integrity is threatened. The evidence in the cases showed that there was a great concern from the internal auditors' side about data security at banks NB and IB more than at companies IC and NC, which is logically expected due to the higher security risk in the banking sector.

10.3.6 Integration

Having different legacy fragmented systems challenged internal control improvement in all cases. ERP systems did not define what the concept for integration is or how it can be developed; however, they implied a technologic that determines how control can be performed through

financial and non-financial representations. ERP systems enabled the integration between processes and the elements of financial statements.

The integration enhanced the internal control in all cases through using only single points of data entry and through the dependability of the business process that required peer review by employees of the work of others. The automated integration of activities made individuals' actions visible and data transparent and raised the importance of self-review for individuals and branches.

10.3.7 Multiple Methods of Control

ERP systems offered many ways to control the same object through providing controls of the logistics and its financial results and controls by maintaining consistency. The exertion of control after implementing ERP systems represented a change of control from an identifiable locus in space and time to a multiplicity of loci. Controlling from multiple angles, locations were possible, in all cases. ERP systems merged various visions of control such as economic vision through controlling financial flows, logistics vision through controlling material flow and information vision through controlling information flow.

10.3.8 Preventive Controls

ERP systems automated many controls and turned them into being preventive more than detective. The ERP prevented violations of any restrictions regarding the removal of electronically stored data and prevented unauthorised, incomplete or incorrect data to be entered or posted to wrong period. ERP systems impose processing constraints that prevented users from adding or updating beyond certain points. These controls were assured by the IT team in NC and by the outsourced IT auditing at NB. Therefore, it is very important for internal auditors to be able to assure the effectiveness of the preventive automated controls, which were not there before the ERP systems.

10.3.9 Standardisation

ERP systems were considered as control technology that emphasises standardisation of business processes. ERP systems standardised the IT infrastructures across functions, which facilitated the sharing of information and the integration of business activities. The standard data entry process in one format leads to data consistency. This assumption enhanced the abilities of the internal auditors since it became very easy to identify the anomalous transactions as the divergence from the norms became highlighted. This assumption prevented some illegal practice at IC but not at NC. This difference was because at IC the internal auditors' were involved in the implementation and the management wanted to apply and benefit from all ERP systems features.

10.3.10 Transparency and Visibility

Transparency of information through detailed disclosure of data was impossible without integration and a consistent data source. ERP systems offered internal transparency on multi-organisational and managerial levels to enhance accountability, which was welcomed in all cases but NC. ERP systems offered the ability to trace any transaction from the aggregate consolidated level down to the processing level. Working in a more visible environment to others facilitates exercising control. ERP systems enabled great visibility of workplace behaviour as workers are considerably visible to their peers. Accounting numbers in reports reflect operational performance and make it visible and controllable.

10.3.11 Compensating Controls

For IC, ERP systems did not dictate one control for one risk. ERP helped in making a mix of controls to mitigate the same risk. However, for IB there are three lines of defence that complement each other to mitigate risks and not all of them depend on ERP systems as these systems serve back-office processes only. Table 10.2 shows the assumptions

matrix, while Fig. 10.1 shows the assumptions behind ERP systems control logic.

10.4 Aligning Efforts Among ERP, Governance and IAF

A related implementation issue was alignment, where several aligning viewpoints were taken into consideration. The governance improvement efforts focus on increasing transparency, accountability and clarifying the segregation of duties which were proven to be supported by ERP systems. As ERP systems are considered as control technology, they are by default in alignment with the governance objectives.

ERP systems and governance rules were complementary in their impact on the IAF. Governance rules and ERP systems were considered as two sides of the same coin. Governance rules draw the process guidelines, while ERP systems execute work processes taking into consideration these rules. ERP systems were recommended as a proof of having good governance practice. ERP systems are considered as a means of changing the governance process through better internal control system and an adapted IAF. Although ERP systems are in alignment with governance objectives, some effort had to be made during the implementation process to maintain this alignment.

10.4.1 Change Management

ERP systems implementation was accompanied by changing the way of doing some processes and consequently a different way of auditing them. ERP systems implementation at NC and NB involved shifting from a rule-breaking, flexible and individualist culture to a standardised and integrated way of doing business. A strong change management plan was prepared at IC and IB, while it was totally absent from the other two cases. The existence of a change management plan had a clear impact on facilitating and directing the adaptation of the IAF.

Table 10.2 ERP systems' control assumptions matrix

		Case study 1 IC	Case study 2 NC	Case study 3 NB	Case study 4 IB
Control principle		Business processes became governed by the systems Control warehousing, cash management, accounts receivables, accounts payables, data transfer and segregation of duties ERP systems stopped the illegal practice and offered greater accountability	Improved the weak internal control system; mitigated financial risks of manipulations and stealing and improved cost control	Control the overall bank from headquarters level over HR, inventory, assets and purchasing transactions Back-office system offered greater accuracy, data transparency and action visibility	Governance tool to enhance internal accountability system. Reduced errors in information flow; supported sharing of information; supported teamwork and improved internal control
Assumptions	Automation	Automated validation process on all levels. Security profiles for each user Automatic segregation of duties test to reveal conflicts in codes Automation controller controlling desktop applications Objects control framework at the backend	Decrease human intervention, automatically link reflect transactions impact on financial records, preserving automatic archiving system, automatic segregation of duties	Automated back-office processes Automatic controlled data access, approvals checking. Prevent from human intervention, compliance with rules, increase information availability and reduce errors	Automated business process applied long time ago; however, ERP systems were applied in areas that depended on legacy systems with non-automated controls
	Centralisation	ERP systems offered central data consolidation of similar functions	The financial module is a pool that is affected by all transactions take place in all other modules	Central data consolidation across all branches to control the inventory, HR, purchasing and assets centrally from headquarter	Centralised access to all needed information without physical visits
	Continuous monitoring	Real-time data sharing Multi-path query Multi-purpose reports Result from automation and integration	ERP systems made many of the internal auditing practice redundant through their continuous monitoring functionalities	Internal auditors had no interest on using the continuous monitoring features. They did not ask about activating these reports	Better automatic monitoring and control on real time. IAF has open access for real-time information
	Data consistency	SAP generated consistency between financial and non-financial information. Unify mass-data volume economically, eliminate data duplication, redundancy	SAP systems offered consistence reports of production, sales, procurements and financials Comparable data reports with previous years	One general ledger and one chart of accounts Comparable data between branches and departments	ERP systems helped ensuring that information remains structured updated, accurate, detailed, organised and reliable
	Data security	ERP systems restricted security rules that prevented most of fraud opportunities using role-based access control	Reduce data redundancy, standardise interfaces and enable controlled access	Function security Data security Role-based access control and profile options	Strict security rules that prevent data manipulations Data access control
	Integration	Integrated business process and integrated data process cycle Integrated internal control system rather than isolating internal controls	Efficient and effective communication across functions. Increase the importance of the "peer review"	Integrated front-office business process with back-office processes. Increase the importance of the "self-review"	Integrated front-office business process with back-office processes. Integrated infrastructure help in adding software for especial investigations

(Continued)

Table 10.2 (Continued)

		Case study 1 IC	Case study 2 NC	Case study 3 NB	Case study 4 IB
	Multiple methods of control	New non-financial controls Inherent controls delivered with SAP Configurable controls Security controls Reporting controls	Not all control possibilities offered by ERP systems were used	Control from multiple angles locations or visions possible: Economic vision, logistics vision and Information vision	Integrated financial view with the operational view offers many ways to control the same transaction
	Preventive controls	Access protection system Automation controller Objects control framework	Authorisation lists and segregation of duties Not all controlling features were used	Incidence response and reporting. User profile according to segregation of duties Access controls	The authorisation, security and access controls
	Standardisation	Standard business processes Standard accounting structure	Not all activities were standardised. Some preferable processes cannot be standardised since they are illegal	Standard back-office business processes with Standard accounting structure	ERP standardised the back-office functions
	Transparency	Data transparency Actions visibility Traceability	Visibility to management and to peers More transparency, while the company is not ready for this practice	Data transparency Visibility to peers and to managers Traceability Extends the exercise of self-review	Full view about data entered from different branches and departments by storing data in one integrated database with the ability to retrieve these data from different positions
	Compensating controls	Based on the multiple controls offered by the systems	No evidence	No evidence	Three lines of defence are not related to ERP systems

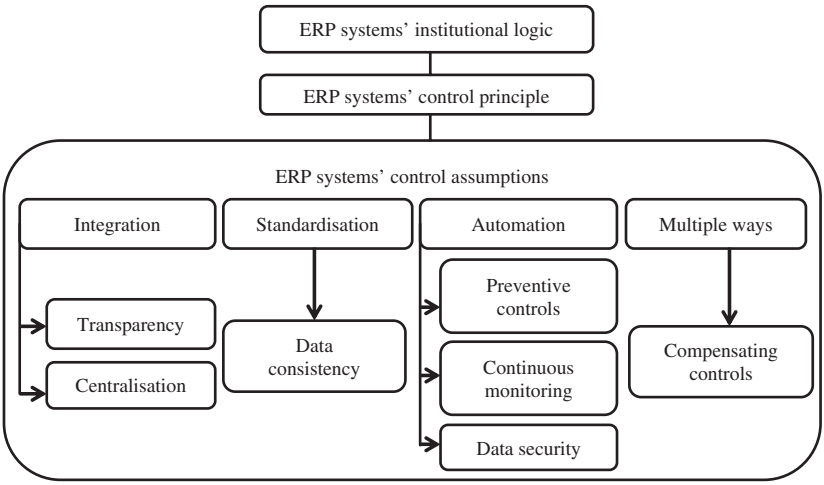

Fig. 10.1 The assumptions behind ERP systems control logic

10.4.2 Reengineering and Customisation

The level of mixture between reengineering the processes or systems customisation depended on the management orientation in terms of keeping the old work routines or changing to benefit from best practice. By implementing ERP systems, illegal procedures could not continue and had to be reengineered at IC as they could not be customised within the systems, while these practices continued at NC through workaround. For NB and IB, there was a need for customisation from the control point of view to add the function of checker to some processes.

10.4.3 Internal Auditors' Involvement in ERP Implementation

Processes should be made auditable before an internal audit can be conducted. Auditors' involvement in the implementation mainly depended on the effectiveness of the IAF; therefore, they were totally involved at IC and IB. The need to be objective did not exclude the possibility that

management could request an internal auditor's opinion on specific matters related to the internal control.

The involvement of internal auditors in the ERP systems implementation process had benefits in two ways. First, internal auditors have wide view of business processes and know the business policies and segregation of duties rules, therefore preventing control problems after implementation. Second, the internal audit team's involvement gave them important awareness about the controls within the systems and how the business process is handled by the systems. Auditors' involvement in the implementation process enhances the system's impact on the internal control system. Internal auditors who take responsibility for governance will also have an important role in ERP governance to ensure IT alignment with organisational goals. The IAF role assured the harmony among corporate governance, policies, ERP systems and business processes.

Table 10.3 shows different alignment efforts that took place in each case to highlight the impact of these efforts on the IAF adaptation later on.

10.5 The IAF Adaptations

Adapting the way internal auditors operate was an integral part of maintaining the IAF's legitimacy. This adaptation involved changes in the structure and practice of the IAF. The changes in the IAF as a result of ERP systems introduction were difficult to quantify; therefore, each aspect of the IAF's practice and structure was investigated after implementation.

10.5.1 Scope of Services and Practice

The change in the practice of the IAF depended to a great extent on its effectiveness and on the role it played before ERP systems implementation; the change management plan; the support from the audit committee; the acquiescence to the governance institutional pressures; and

Table 10.3 ERP systems implementation aligning efforts matrix

	Case study 1 IC	Case study 2 NC	Case study 3 NB	Case study 4 IB
Alignment	Offer transparency Comply with the SOX Decrease key controls Standard process going according to all policies, rules, regulations and international standards	Procedures and duties for each function become documented ERP systems collided with the way of managing the business	ERP systems were recommended by the central bank of Egypt to improve the governance within banks	ERP systems became an integral part of the governance landscape ERP systems made the compliance audit, control audit and financial audit much easier
Change management	Agreed plan to change management Consultancy agencies support the required change management. A dedicated change management team including internal auditors	There was no proper management plan for change. Workaround the systems to keep some preferred practice	There was not predefined change management plan or proper training to prepare users to accept changes. The aim was to keep all working customs	Change management plan Extensive continuous training Rewards to implement ERP modules Great attention to manage the changes needed in the IAF
Reengineering and customisation efforts	Customisations in reporting localisation in terms of laws Illegal procedures stopped The processes were reengineered to be in an auditable format	Some ways to work around the systems were arranged to keep the preferred practice Some localisation to systems to be compatible with tax laws purposes	Insisted to follow their old process and ask for customisation to systems Localised solutions regarding taxations Some workaround	ERP systems did not initiate much business processes reengineering. Configured to cover local needs, segregation of duties and reporting area

(Continued)

Table 10.3 (Continued)

	Case study 1 IC	Case study 2 NC	Case study 3 NB	Case study 4 IB
The IAF role in ERP systems implementation	Auditors participated effectively during requirement gathering and mapping The main input related to roles and authorisations to ensure a fit control environment Capture ERP system features Set reporting requirements Assuring that there is not any financial data loss when transferring to ERP system	Internal auditors had no role at all to play at any stage of the ERP systems implementation There were not qualified internal auditors could add value through participation	Internal auditors were not involved by any means in the ERP systems implementation Inspection department was involved after implementation stage and had some reporting requirements Their absence not only had an impact on the implementation, but also had some repercussions on the IAF later on	Raised the importance of implementing ERP systems Auditors were involved in the process of choosing the needed modules and choosing the appropriate vendor Were involved from the early stages and had an added value Assure compliance with manuals Auditors were considered as super users

the IAF involvement in the implementation. Where the IAF was doing traditional checking of the correctness of the accounting figures, then ERP systems easily replaced this function. Where the IAF could be well adapted, it turned into an integrated IAF on different levels. The integration could be on one of three levels. The first level of the integrated auditing practice covers the whole business with many auditors responsible for each function such as financial, HR, logistics, marketing and IT. The second level is to have an integrated IT and financial internal audit plan, while the third level is to have narrow scope of practice that focus on processes across functions through having comprehensive auditors.

The study finds that in IC and IB, where ERP systems were properly utilised the internal control became a collective affair. Many departments are involved in the internal control responsibilities; consequently, the IAF scope of service was expanded to assure these control activities were carried out by many other departments. In the cases where the IAF was expanded, it got new responsibilities including checking automated internal control procedures of segregation of duties and access rights; information security in relation to IT; assuring not only the functionality of list of controls but also the existence of compensating controls and IT operational control assessment; and giving consultancy advice to improve the business, while in other cases where the IAF could not adapt, internal auditors were assigned other responsibilities apart from auditing.

10.5.2 The Structure of the IAF

Having a balanced internal audit team was crucial for supporting an integrated business working environment. While IS was considered to be a domain for specialised IT auditors, after implementing ERP systems all the processes became all auditors' concern. Where the structure of the IAF was adapted, it became an integrated internal audit team that included individuals who had various backgrounds including financial, accounting, HR, business and IT. Within the younger internal audit team there were dedicated individuals for internal control checking

including segregation of duties and access rights, risk management, IT auditors and IT security officers.

In other cases which could not adapt, the organisational restructure after ERP systems implementations was not in the favour of internal auditors. Where the control assurance became the responsibility of everyone, the value added by the internal audit team reduced. After ERP systems implementation, the internal control assurance was not the responsibility of IAF only.

10.5.3 Internal Auditors' Skills

The study finds that in most cases, the available skills before ERP systems, training sessions and involving the internal audit team in ERP system implementation affected the adaption of the IAF's skills. Internal auditors needed to be trained in technical areas of auditing, internal control, fraud detection and accounting in the new working environment of the ERP. In addition to these skills, the participants emphasised that there was a need for some important social soft interaction skills in order to be able to interact within an integrated team, with the auditees, IT team, audit committee and management. Skills such as business and system knowledge and judgement are needed as well.

In the international organisations IC and IB, there was great attention given to the skills of the audit team members; every auditor was required to complete a certain number of hours of training per year that included internal or external training courses, online or computer-based training or self-study. Therefore, the impact of ERP systems implementation was to focus this training on some specific new skills and knowledge.

10.5.4 Internal Auditing Tools

ERP system implementation did not encourage acquiring new special software for internal auditing proposes in all cases; however, the ERP system itself offered internal auditors reporting tools and notifications options which were very helpful. The differences among cases were in

the degree of utilising the tools offered by the ERP systems for control assurance. ERP systems allowed internal auditors to interrogate large volumes of data and run multiple queries to extract information, which help detecting internal control breaches, errors and potential frauds.

10.5.5 The IAF Sourcing

The ERP working environment required different skills and competencies in the internal audit team. Internal auditing became more advanced and specialised in terms of technical competence. Organisations faced the choice of whether to develop these broader competencies internally or to outsource internal auditing to outside service providers. An internal audit team which has the experience of the problems encountered before and during the implementation stage was much better equipped than others who do not have this experience. Therefore, IC and IB preferred having a qualified internal audit team than outsource the IAF, while IT auditing was the only outsourced part of the IAF in NB.

10.5.6 Internal Auditors' Relationship with the IT Department

However, in the ERP systems working environment, the IT audit has been identified as one of the most difficult specialties for internal audit staff, developing a rotational relationship between internal auditors and the IT team provided benefits due to reduced recruiting and consulting costs as well as increased quality of auditors' understanding of the systems.

The degree of collaboration increased after the introduction of ERP systems to different levels. Internal audit team became closer to the IT team; however, not all the internal audit team members have a direct link with the IT team. Internal auditors depend on the IT team to understand technical details. The audit and control functions collaborated with the IT team in making tailored systems to help them in their monitoring role.

In the cases of having a weak IAF as at NC, the IT team supported the management needs through monitoring the activities on the systems, assuring the segregation of duties and assuring the correctness of the financial numbers. Internal auditors preferred not to deal directly with the system as they did not have enough knowledge to write or run any queries. The importance of the internal auditors went down compared with the IT team.

10.5.7 The Size of the Internal Audit Team

ERP systems integration and automation reduced the amount of information posting and eliminated some jobs. The ERP systems' complexity widened internal auditing analytical processes. In some cases, the ERP system implementation decreased the number of the traditional internal auditors. However, in IC and IB, the internal audit team increased as internal auditors from different backgrounds became needed. In other cases, the IAF eroded after ERP systems implementation for many reasons including: the IAF maintained a very traditional auditing mindset that did not add value; internal auditors did not participate in ERP systems implementation to know how ERP systems would affect their work; there was no interest or support from the top management to improve the IAF as the IT team and the ERP systems overcame the need to have a traditional IAF.

10.5.8 The IAF Budget

ERP systems reduced the cost of audit investigations through the offered visibility. Making the best use of the ERP systems' features in controlling and monitoring the business process through having an integrated and balanced internal audit team saved a substantial part of the audit budget. However, the budget of the IAF increased slightly as some specialists from different areas have been allocated to the internal audit team to make it an integrated IAF at IC and IB where there was also increased investment in qualifying the internal audit team. The IT

audit outsourcing is a new component in the budget at NB, because of not having the required skills in house.

10.5.9 Internal Auditors' Relationship with the External Auditor

The external auditors' decision about the extent of dependency is affected by the IAF structure, reporting system, independency, qualified staff available, training, audit tools and techniques and experience and history of previous audits. Mainly the experience and history of previous audits affected the relationship after ERP systems introduction. Where there was confidence in the efficiency of the IAF, ERP systems did not change the relationship significantly but could increase this confidence at IB and IC. If the external auditors were concerned about the low level of the internal auditors' qualifications, implementing ERP systems had a negative impact on the confidence of the external auditors in the IAF. Generally, the external auditors were sensitive in the year of implementation because of the huge change taking place.

10.5.10 The IAF Strategic Response

ERP systems constituted the stimulus for internal auditors to relate these systems to their roles and responsibilities and thus to their professional identity. The internal auditors faced pressures at the functional level that mainly related to their shared professional values and trends and made them adapt to advanced practice. Uncertainty increased over the new internal audit practice and structure; the CIAs searched for new ideas from professional communities and imitated the practice already adopted by others.

ERP systems triggered profound adaptations. The IAF should be flexible enough to take full advantage of opportunities. The IAF's effectiveness was an important variable in the internal auditors' strategic responses to ERP systems introduction. The IAF adaptation and responses matrix are shown in Table 10.4. Internal auditors'

Table 10.4 The internal audit function adaptation and responses matrix

	Case study 1 IC	Case study 2 NC	Case study 3 NB	Case study 4 IB
Scope of services	The implementation of ERP systems was exploited by extending areas of involvement Integrated auditing in comprehensive approach where all the business became included in the IAF scope Application controls are covered seamlessly during end-to-end audits From doing routine checking to creative, analytical internal control review in more risk-based manner	The narrow scope of the IAF was mostly covered by ERP systems and the value of the traditional IAF quickly disappeared Less need for substantive testing ERP systems do more than what internal auditors were doing Other responsibilities than auditing	The IAF became easier with narrower scope Focus moved from functions to processes, so a new concept appeared that is "comprehensive auditor" The scope was reduced as ERP do most of audit duties	Replaced and consolidated many auditing tasks. Helped in improving and expanding financial, compliance and operational audits The role of internal auditors was evolved and the scope of audits is expanded Financial and IT-integrated auditing
The IAF's structure	The internal audit team includes individuals who have IT, marketing, human resource, manufacturing and financial backgrounds. The team contains younger auditors and more multi-disciplinary experience than older financial auditors	The management believed that there is no need to have a separate IAF as it was absorbed in the organisational structure All internal auditors left the company except the youngest one	Centralised internal audit at headquarters doing comprehensive inspection and financial audits Younger internal auditors became preferable	Already had an integrated audit team but enhanced to have gathered general auditors, and IT-specialised auditors Trend to have some individuals with professional qualifications and younger

(Continued)

Table 10.4 (Continued)

	Case study 1 IC	Case study 2 NC	Case study 3 NB	Case study 4 IB
Skills	The audit view shifted from functional to process with understanding of the technicalities and security aspects. New skills include computer skills, systems knowledge, communication skills, IT-related risks and consulting skills	Traditional auditing skills of tracing transactions are not needed anymore Internal auditors did not receive proper training to improve their capabilities	There was a difficulty in gaining the multidimensional skills needed to create an internal audit team comprising cross-functional members. Insufficient training in order to improve auditing skills	Implementing ERP systems did not affect much the set of skills in the audit team Skills of extracting data from ERP system
Tools	No new special software for internal auditing proposes ERP systems offer internal auditors helpful tools	ERP systems implementations did not motivate to use audit tools SAP systems were not been used at all by internal auditors	There was no specific auditing tool used by the bank before or after ERP Reporting system "Business Objects" software was implemented	The internal auditors make the best use of the systems as they were already using the latest audit methodologies and related IT-based solutions
Source	ERP systems did not generate the need for IAF outsourcing Having qualified internal audit team is much preferable than outsource the IAF	The IAF neither outsourced nor improved but eroded	The common perception that the IAF can be done by anyone The IT auditing is outsourced to external service providers who can bring in the required expertise and experience	There was no need to even partly outsource IAF IB had all needed experience to do all types of auditing and any needed specialist can be provided by the audit group

(Continued)

Table 10.4 (Continued)

	Case study 1 IC	Case study 2 NC	Case study 3 NB	Case study 4 IB
Relationship with IT department	The close relation between the IAF and the IT professionals started with ERP systems implementation stage when defining the segregation of duties Not all the internal audit team members have direct link with the IT team	IT team members have accounting background and understand SAP systems; therefore they do some of the duties that are supposed to be done by internal auditors	IT individuals are considered as enabler for internal auditors. The mutual working relation became stronger as they work as complementary teams The importance of the internal auditors went down compared with the IT team	ERP systems implementation strengthened the work relationship between the IAF and the IT team
Size	ERP systems implementation has caused an increase in the size of the internal audit team	The IAF has been eroded after ERP systems implementation	ERP systems make the traditional IAF easier and centralised; therefore the size of the internal audit department has decreased	The size of the IAF could increase because of the expansion not mainly because of ERP systems. Incorporating experts is related to ERP systems implementation
Budget	ERP systems implementation did not significantly affect the annual budget of the IAF	The budget assigned to the IAF was reduced significantly as the team reduced from nine to be only one	The IAF budget reduced by the ERP systems implementation. The IT audit outsourcing increased as a new component in the budget	Budget decreased slightly with the ERP systems implementation

(Continued)

Table 10.4 (Continued)

	Case study 1 IC	Case study 2 NC	Case study 3 NB	Case study 4 IB
Relationship with external auditor	The SAP did not change the relation significantly ERP systems improved internal auditing accuracy and reliability	ERP systems did not affect the work relation as it was very weak before or after	Implementing ERP systems had a negative impact on the confidence of the external auditors on the IAF	ERP systems did not change the well-established relationship and confidence
Response	Compromise strategy through bargaining and balancing tactics-acquiescence strategy through compliance, habit and imitation tactics	Internal auditors tried to use defiance strategy through dismissing, challenging and attacking tactics; however their efforts could not succeed	Defiance response was done through tactics of attacking, challenging and dismissing. Internal auditors used the avoidance response through tactics of escape, buffer and conceal Remaining internal auditors considered the unqualified conformity unworkable therefore they used the compromise response through balance tactic	The internal auditors adopted acquiescence strategy through imitation tactics

involvement in ERP systems implementation gave them the opportunity to respond constructively. Active forms of resistance did not work, and internal auditors' efforts did not succeed, when the IAF was weak. When the resistance strategies did not work, internal auditors had two main options, to compromise or avoidance.

The IAF needs to adapt as rapidly as the working environment, or it will lose its legitimacy. Results imply that partial compromise allowed for existing practice to remain unchanged, whereas full acquiescence could only be reached by changing the nature of these practices. An important observation is that the strategies used seem to be temporary and often led to a move towards acceptance. One major finding emerged from the study that different sources of institutional influence evoke different strategic responses. The higher the pressure which was applied, the less the active strategies would be chosen. At IB and IC, before implementing ERP systems, all the requirements were agreed and a strong change management plan was put in place by the head office outside Egypt. Therefore, there was great pressure to manage the changes needed in the IAF from the group audit team.

Given the initial fear of the internal auditors that the ERP systems would replace them, it was surprising that they seized this as an opportunity to increase their scope and become a comprehensive audit with an integrated team. In this case, the IAF's practice and structure could not be completely explained by considering the governance institutional pressures . Thus, through the interviews, the ERP systems influence on the adaptation of the IAF has been understood. Therefore, there was an acquiescence response through mimetic behaviour in which the IAF sought to model the practice of similar organisations which were perceived to be more legitimate. Consultants and the professional network within the international organisations facilitated the copying process of the successful internal audit practice and structure of the organisations that had implemented ERP systems before.

The impact of ERP systems implementation on the IAF mainly depended on the level of the IAF quality before ERP. Where there was a good IAF before implementation, then ERP systems worked as a great motivation for this function to have a great revolution, while where there was a poor IAF before ERP, it easily lost its importance after ERP

systems implementation. Where it was strong, the IAF could improve to add more value after ERP systems implementation, while where it was weak it was very easily broken up. It can be concluded that while the implementation of ERP systems has the ability to facilitate change to the IAF, the willingness of internal auditors to accept change is critical. Table 10.4 shows the matrix of the IAF adaptation and responses.

10.6 IAF Legitimacy After ERP Implementation

One way to understand how a profession survives is to focus on its use of specific techniques to control and modify the system of knowledge in response to forces that open and close jurisdictions, provide new models for practice and change the legitimisation criteria (Abbott 1988). Moreover, Meyer and Rowan (1977) and DiMaggio and Powell (1991) suggest that the quest of legitimacy is one of the main motives behind the development of social practice such as internal auditing.

At IC, the IAF maintained pragmatic legitimacy through self-interest to adapt to improve their identity within the organisation. Moral legitimacy has been achieved as the adaptation was in alignment with the prevailing normative professional prescriptions and standards as "the right thing to do", which required adaptation to maintain capability of providing internal control assurance and assist risk management. Therefore, the adaptation was considered as complying with the directions of the normative governance pressures.

On the organisational level, NC could not apply acquiescence strategy as there was no need to legitimate through having an adapted IAF. This was because the weak coercive and normative governance pressures related to the IAF and the absence of a successful adapted IAF model to imitate. One dimension of external legitimisation for NC was to achieve legitimacy by decoupling the inner core from their external environment. This was the way that NC used as there was no actual IAF; however, they kept only one internal auditor as a symbol of having an IAF. Internal auditors saw their role as being to serve their managerial clients rather than the public or investors since this affects what they regard as legitimate. Therefore, ERP systems and IT team served the managerial needs and the IAF lost its legitimacy.

For NB, the conformity with conventional beliefs, which was supported by the coercive and normative governance pressures, legitimated the IAF. The IAF at NB maintained its moral legitimacy through adhering to the inspection concept that is acceptable within the national banking sector. At IB, one of the legitimacy-maintenance strategies that has been used by the internal auditors was to focus on enhancing the ability to foresee the emerging challenges from ERP systems introduction. In addition to guarding against challenges, they seek to buttress the legitimacy they have already acquired.

According to the modern definition of the IAF by the IIA, the IAF should be legitimate through being able to assure the internal control and assess risks. ERP systems can be considered as a potential threat to the IAF's legitimacy.

10.6.1 Ability of the IAF to Provide Control Assurance

These internal auditors who maintained their legitimacy adapted to be capable of adding value by controlling the integration of ERP systems with other systems and assure the effectiveness of any new controls applied within ERP systems to mitigate risks. ERP systems were considered by these internal auditors as internal control tools that improved their service regarding internal control assurance. Others in the IAF, who could not adapt, felt threatened especially because of the IT team's involvement in the internal control assurance at NC and NB. There was no need for deep technical knowledge to assure internal control systems after ERP systems implementation. When internal auditors assured the implementation of the segregation of duties rules on the systems and assured that all the feeding processes were done correctly, then the internal auditors gave assurance about the effectiveness of the internal control system.

10.6.2 The IAF Ability to Support Risk Management

The nature of risks is different after ERP systems implementation from using legacy or manual-based processes. Internal auditors who maintained their legitimacy adapted so as to be able to assess all types of risks

and determine the sufficiency of internal controls. The IAF supported risk management through a comprehensive risk-based assessment at IB and IC. ERP systems offered internal auditors a good opportunity to be more involved in the risk management process. Where the ERP systems implementation was a well-planned project, there were few new operational risks afterwards. Adding IT auditors to the internal audit team after implementing an ERP system was important for managing technical risks.

Other IAFs preferred a traditional function and avoided using the systems to improve their profession, so their legitimacy as a governance tool was threatened. In these cases, other parties such as the IT team, internal controllers and IT security officers played a more effective role in supporting the risk management processes.

10.6.3 The IAF Importance After Implementing ERP

The importance of the IAF depended on the organisational culture. International organisations gave the IAF a respected position. ERP systems implementation by itself did not change the internal audit's position; however, the role played by internal auditors during the implementation process and their intention to benefit from ERP systems increased their knowledge of the system. Consequently, the IAF's value within the organisation was increased. The IAF's involvement in ERP systems implementation can be considered as proof of the trust and understanding of the top management of the importance of the IAF. The IAF is the maestro who keeps harmony among governance, external and internal rules and policies and ERP systems and business processes. ERP systems supported the IAF position as an important governance tool. More weight was given to the IAF than ever before. The IAF was considered as a very important function that is highly appreciated by all stakeholders, and any kind of support needed by the IAF is immediately provided. Here the IAF was the main generator of change.

In the national cases, the top management did not attach importance to the IAF. This lack of regard was reflected at NC in having a dummy audit committee on paper only which was not activated. The IAF was

part of the financial department and reports to the top financial manager. The IAF could not work as a governance tool to support risk management and internal control assurance.

The abilities of the IAF to do the activities that legitimise are shown in Table 10.5, and the meta-matrix is shown in Table 10.6.

10.7 Reflections on Findings

"Conflicting literature represents an opportunity. The juxtaposition of conflicting results forces researchers into a more creative, frame breaking mode of thinking than they might otherwise be able to achieve" (Eisenhardt 1989, p. 544). Therefore, this section aims to highlight and discuss the consistencies and inconsistencies between the findings of this study and findings of the previous literature when available.

10.7.1 IAF-Related Governance External Pressures

Institutional environments influence the macro-level through the "archetypes they develop for actors, the logics they legitimate and the governance systems and rules of social action they support" (Scott et al. 2000, p. 166). On the macro-level, the governance pressures to adapt the IAF, to automate and integrate internal audit activities, to extend audit scope, to develop audit skills and to support the IAF standing within businesses were weak in Egypt. Internal auditors stressed the fact that Egyptian laws did not include rules that state their rights and obligations but, in Egypt, there is no strong independent professional organisation and there are no standardised measures for internal audit quality.

Very few studies address the corporate governance institutional pressures upon the IAF (e.g. Al-Twaijry et al. 2003; Arena et al. 2006). These studies have focused on investigating the impact of governance institutional pressures on the establishment of internal audit departments at the country level (Saudi and Italy), while the current study

Table 10.5 The internal audit function legitimacy matrix

	Case study 1 IC	Case study 2 NC	Case study 3 NB	Case study 4 IB
Internal control assurance	IAF responsible for assuring functionality and effectiveness of internal controls in mitigating risks, whether these controls are manual controls or automatic	IAF could not assure the effectiveness of internal controls after most of the internal controls they used to review became automated based on ERP systems	IAF emphasised more of financial controls; while IT department paid more attention to technical security controls	Internal auditors proved that they are able to provide proper assurance of the efficiency of the internal control systems even after ERP systems implementation and turning towards more automated controls
Risk management	The auditing practice are risk-based Internal auditors are more capable than others of assessing risk sources and help in mitigating these risks effectively	The IT team are responsible for assessing and managing technical risks and internal auditors have no role to play in this issue	IT and risk management departments are responsible for assessing and managing risks, while internal auditors have no noticeable role	The IAF prepare a risk mapping process to classify risks from high to low in different areas within the bank. Internal auditing is risk-based before and after ERP systems implementation
Position after ERP	IAF has prestige within the company, especially after their effective role in the successful implementation and stabilisation of ERP systems in the company	The IAF could not survive after ERP systems implementation as it did not receive the proper support to adapt	ERP systems implementation did not raise the importance of the IAF. It highlighted the IAF deficiencies and areas that needed improvements	The internal auditors succeeded in preserving a very good image for their profession. They reduced the gap between their desired and perceived professional images. Internal auditors are capable to meet the technical and social demands of their function

Table 10.6 Meta-matrix

			Case study 1 IC	Case study 2 NC	Case study 3 NB	Case study 4 IB
Sector			Customer goods companies		Banks	
ERP			SAP		Oracle	
			Inter-national	National	National	Inter-national
Corporate governance institutional pressures	**Coercive**	Egyptian regulations	X	X	X	X
		Egyptian Supervisory institutions	X	X	✓	X
		International regulations	✓	X	X	✓
		Head office policies	✓	X	X	✓
		External auditor	X	✓	✓	X
	Normative	Professional network	✓	X	X	✓
		Formal education	–	X	X	–
	Mimetic	Copy successful model	✓	X	X	✓
ERP systems' logic of control			✓	✓	✓	✓
Assumptions	Automation		✓	✓	✓	✓
	Centralisation		X	✓	✓	✓
	Continuous monitoring		✓	X	X	✓
	Data consistency		✓	✓	✓	✓
	Data security		X	✓	✓	✓
	Integration		✓	✓	✓	✓
	Multiple methods of control		✓	✓	✓	✓
	Preventive controls		✓	X	✓	✓
	Standardisation		✓	X	✓	✓
	Transparency		✓	X	✓	✓
	Compensating controls		✓	X	X	✓

(Continued)

Table 10.6 (Continued)

		Case study 1 IC	Case study 2 NC	Case study 3 NB	Case study 4 IB
Aligning efforts	Alignment	✓	✓	✓	✓
	Change management	✓	X	X	✓
	Reengineering and customisation	✓	✓	✓	✓
	The internal audit role	✓	X	X	✓
IAF changes	Scope of services and practice change	✓	✓	✓	✓
	Structure change	✓	✓	X	X
	Skills change	✓	X	X	X
	Tools change	X	X	X	X
	IAF outsourcing	X	X	✓	X
	Relations with IT department	✓	✓	✓	✓
	Size	✓	✓	✓	X
	Budget	X	✓	✓	✓
	Relation with external auditor	✓	X	✓	X
IAF responses	Acquiescence	✓	–	–	✓
	Compromise	✓	✓	✓	–
	Avoidance	–	–	✓	–
	Defiance	–	✓	✓	–
	Manipulation	–	–	–	–
IAF legitimacy	Internal control assurance	✓	X	X	✓
	Risk management	✓	X	✓	✓
	IAF Position after ERP	✓	X	X	X

focuses on the impact on the functional practice or structures on the organisation and sub-organisational level.

Egypt is considered as one of the fast-reforming economies (Bolbol et al. 2005); therefore, thorough research using a multiple-case study offers useful policy implications. In accordance with the findings of the previous studies (Al-Twaijry et al. 2003; Arena et al. 2006), it is suggested that there should be more coercion through compulsory regulations to push companies towards maintaining adapted IAFs and organise their activities effectively. The findings of this study are consistent with the results of Arena and Azzone (2009), who suggest that the internal audit professional bodies should redesign the competency sets needed for their profession.

Unlike Al-Twaijry et al. (2003), who investigate the case of internal auditing in Saudi Arabia using a questionnaire study, this study uses institutional theory to understand the IAF changes using in-depth case study on the organisation level. The study results are consistent with the results of Ebaid (2011) who shows that weak organisational status affects negatively the internal audit's role in the governance process, while it shows different results from Arena et al. (2006) who found that there is an influence of regulations on the development of the internal audit in Italy.

10.7.2 Control Assumptions of ERP

Yoo et al. (2007) find that ERP systems embody particular rationalised logic and procedural focus; however, the principle commonly associated with ERP systems is control. They suggest that this control principle is based on assumptions of standardisation, visibility and integration. In this study, all the assumptions related to the ERP control principle were explored and fresh insights were provided by conceiving ERP systems as having control logic in themselves.

On the micro-level, one fruitful way to understand ERP systems challenges was the institutional lens (Gosain 2004; Currie 2009). According to the adopted institutional lens, the study confirmed that ERP systems, which are material carriers of the logic of organisational

actions with associated rationalities, resulted in the emergence of new practice and structure of the IAF which lack a commonly accepted orientation.

Others, such as Bea and Ashcroft (2004) and Kanellou and Spathis (2011), provide evidence that implementation of ERP systems has a large impact on auditing. However, previous research does not investigate in depth how the IAF changed or should change. The participants' responses confirmed that the new logic of ERP systems in controlling the business requires IAF adaptations; otherwise, the importance of this profession would vanish gradually. The findings agree with Kanellou and Spathis (2011) and Chen et al. (2012) that it is obvious that ERPs significantly change the auditing procedure and the internal control. Furthermore, the evidence here offers more understanding of the new logic of ERP systems in controlling the business. ERP systems impose new logic based on some assumptions such as: standardisation, multiple ways, integration, automation, data consistency, compensating controls, transparency, preventive control and continuous monitoring. These assumptions strengthen internal control and reinforce corporate governance.

It has been confirmed that ERP systems, if implemented and used properly, can significantly improve the internal control system. ERP systems offered automatic controls that reduced human intervention errors. ERP systems automated many controls and turned them into being preventive more than detective. This is consistent with previous studies, which suggested that automation is an ERP systems' control assumption as in Sect. 2.2.4 (e.g. Rikhardsson et al. 2005; Chapman and Kihn 2009; Emerson et al. 2009). Automation provided by ERP systems implementation resulted in preventive control and continuous monitoring. ERP systems made data consistent through standardising business processes and unifying the whole data process. The standard data entry process in one standard format leads to data consistency. Some previous studies suggest that the standard data process is a control assumption brought by ERP systems implantation such as discussed in Sect. 2.2.4 (e.g. O'Leary 2000).

ERP systems offered an IT central infrastructure which supported the internal control system consistently, and some previous studies

have highlighted centralisation as a control assumption related to ERP systems as in Sect. 2.2.4 (e.g. Ragowsky and Somers 2002). ERP systems control the business based on the integration offered, as previous studies suggest in Sect. 2.2.4 (e.g. Soh et al. 2000; Mabert et al. 2001; Chapman and Kihn 2009). Integration raised new control concepts that internal auditors should take into consideration when assuring controls such as peer-review and self-review controls. The study findings are consistent with Chapman and Kihn (2009), who propose that the full ERP systems automated integration of functions provides more transparency. In Sect. 2.2.4, some previous studies highlight the increased transparency facilitated by ERP systems implementation (e.g. Elmes et al. 2005).

10.7.3 Aligning Efforts Among ERP, Governance and IAF

ERP systems institutionalise managerial actions and rationalities in the form of institutional logic (Gosain 2004) that clashed with local institutions and caused major problems in some cases. The traditional IAF practice was incongruent with the identified control logic of ERP systems that guide practice. Therefore, alignment did not occur without adapting practice.

ERP systems implementation is a socio-technical challenge that requires a different way of looking at things from purely technologically driven innovations. ERP systems supported the governance efforts through offering transparency and a top-down approach. The findings are consistent with previous studies asserting that change management is a critical issue in ERP implementation. The cascading nature of adaptation required suggests that managers should not underestimate the efforts required for managing change (Robey et al. 2002). The study results are consistent with Chen (2009) about the importance of aligning ERP systems implementation with corporate governance processes. As suggested by Spathis and Constantinides (2004) and Nicolaou and McKnight (2006), the findings also suggest that the implied logic of ERP systems enhances the corporate governance process through increased transparency and the significant impact on control processes.

These findings support Chen (2009), who concluded that ERP should be considered as a part of the corporate governance system. The research findings confirmed that ERP systems were considered as a corporate governance tool, but only when internal auditors are well involved in the early stages of the systems implementation. Unlike the findings of Saharia et al. (2008), this study found that internal auditors played an important role in defining internal control and in reengineering efforts necessitated by ERP implementation. Internal audit participation in ERP systems implementation gave them opportunities to insure that all controls were in place and the process was compatible with the standards. This agrees with Glover et al. (1999), who suggests that internal auditors can use their understanding of operations and risks to help in implementing ERP systems. The research results added that the involvement of the internal auditors during the implementation stage can have a great impact on considering these systems as a corporate governance mechanism. In agreement with Nwankpa and Datta (2012), this study finds that it is prudent to involve internal auditors in playing an active role in the implementation phase of the ERP. Moreover, in accordance with Scott (2008), the substantial changes in the logic governing professional work have increasingly invaded many of the more traditional professions such as IAF.

10.7.4 The IAF Adaptation

Many studies have highlighted the need to change the IAF as it faces various technological challenges and gains unprecedented importance as a corporate governance actor (e.g. Smith 2000). Others suggest that ERP systems have driven radical changes in audit processes (Sutton 2006; Grabski et al. 2011); however, no study has focused on investigating the adaptation and the response to these challenges.

The research evidence shows that traditional internal auditing practice in terms of financial and regularity audit is less important. The dominant approach was the comprehensive audit focusing on aspects of efficiency and effectiveness in the whole business. In accordance with Chen et al. (2012), the study suggests that the importance of

transactions audit has decreased since ERP implementation. The IAF, in some cases, needed to do extend its scope from purely control assurance to many areas which were not in its scope before. This finding agrees with Dechow and Mouritsen (2005), who conclude that internal controls become a collective affair, where the ERP defines the logic through which a control function is performed, as discussed in Sect. 2.3.3. Moreover, the findings match the results of the previous research on management accounting, reviewed in Sect. 2.4.1. For example, Scapens and Jazayeri (2003) observe a widening of the role of the management accountants.

Confirming Saharia's et al. (2008) results, the study suggests that ERP systems implementation generates a need for additional skills in the internal audit team. They must have enough system knowledge and skills to understand the internal workings of the implemented ERP systems; however, the evidence here emphasises that there is a need for not only IT or system knowledge but also communication skills in order to be able to work in an integrated team. These results agree with Gramling et al. (2004) that further skills are needed for internal auditors to expand the scope of assurance that is a cornerstone of the role of IAF in corporate governance.

Although the assurance of the reliability of internal controls is much more critical for an ERP system, the study findings are inconsistent with the suggestion of Bae and Ashcroft (2004) that auditors need to heavily rely on CAAT and with Lightle and Vallario (2003), who claim that auditors need new software tools to help them expedite the segregation of duties testing process; otherwise, their ability to assure controls would be compromised. The findings are consistent with results from management accounting as discussed in Sect. 2.4.1 that no sophisticated management accounting techniques have been introduced after ERP systems implementation (Scapens and Jazayeri 2003). Furthermore, the study finds that where the IAF did not possess skills then the IT audit was completely outsourced. These findings are consistent with previous studies, discussed in Sect. 2.6.5 (e.g. Abdolmohammadi and Boss 2010).

The study finds that organisations with highly advanced abilities to use information derived from an ERP and to understand assumptions

behind its control logic have adapted their IAF's practice and structure. This is consistent with Davenport et al. (2004) referred to in Sect. 2.2.2, who suggest that these organisations have the potential to alter job roles and change their organisational structures.

The study findings confirm that ERP, based on its control assumptions, is a catalyst to change the internal auditors' role, which is in agreement with the findings in management accounting as discussed in Sect 2.4.1. For example, Granlund and Mouritsen (2003) conclude that the management accountants' roles were redefined, although they did not find a clear causal relationship between IT and management accounting work. The findings regarding the increase of the IAF's scope of services to cover non-financial aspects and access control are consistent with the suggestions in the literature. As discussed in Sect. 2.3.3, the findings are consistent with Glover et al. (1999), who claims that internal auditors toned to have experience of controlling the non-financial side of the business and with Rikhardsson et al. (2005) who suggests that the importance of controlling access and use of information is increased. These findings agree with the suggestion of Arnold and Sutton (2007) that internal auditors need to focus on the ERP system process to assure robust internal controls in order to ensure complete, accurate, authorised and valid processing of all transactions.

The study results regarding the increase of the scope of services do not show, in most cases, a huge increase in the consultation. This is inconsistent with Selim et al. (2009) who document a significant increase in consulting practice in the UK, Ireland and Italy. The study results regarding the increase of the scope of services do not show a role for the IAF in deciding the proper degree of security. This is inconsistent with She and Thuraisingham (2007), who claim that internal auditors may play a role in deciding the degree of the security to trade off between cost, time, complexity of operations and security needs.

The importance of the internal auditors declined, in some cases, compared with the IT team. This finding is similar to the results in management accounting as discussed in Sect. 2.4.1, where for example, Newman and Westrup (2005) show that neglecting the relationship between management accountants and ERP systems allows other groups to wrest control from management accountants and take over ERP

work themselves. Moreover, the findings agree with what Allen (2008) suggests in (Sect. 3.2.6) that the internal audit department should work closely with the IT department. The findings gave multiple insights in different cases as an answer to the questions that have been asked by Sumners and Soileou (2008), who wanted to know how the internal auditors' interaction with the IT department changes after ERP system implementation.

The internal audit team increased in number, in some cases, as internal auditors from different backgrounds became needed. This finding is inconsistent with the results in management accounting, Sect. 2.4. For example, Chapman and Chua (2003) provide evidence that both aspects of automation and integration in ERP systems cause a reduction in the size of the managerial accounting function. However, as the interviews were conducted shortly after implementation of the ERP system, the increase in the number of internal auditors may have been only temporary until people got used to using it.

Furthermore, the findings confirm the suggestions in (Sect. 3.2.8) of Petter et al. (2008) that a significant internal audit cost is related to the complexity of recent IT and Abdolmohammadi and Boss (2010), who suggest that the significance of the budget of the IAF is related to the complexity of the IT. Additionally, the study results are inconsistent with Glover et al. (2008) because the results show that there is a weak interaction between internal and external auditors, while this study confirms the suggestion of Munro and Stewart (2010) that changes in the internal audit are likely to impact external auditors' reliance decisions

Dillard et al. (2004) classify organisations into innovators and late adopters based on the extent to which organisations introduce new practice or implement successful practice. The study finds that the responses of the IAF went through more than one stage and the implementation of a new practice by a late adopter legitimises the practice and encourages additional late adopters to implement the practice.

In accordance with Oliver (1991), the study finds that when conformance was anticipated to enhance legitimacy, acquiescence was the response to institutional influence. Therefore, IAFs that adapt to the ERP systems working environment thrive, whereas those continued to follow a traditional compliance approach could not survive. In

accordance with Oliver (1991), the study finds that when the extent of the institutional pressures are consistent with goals they would be inclined to select less active strategies such as compromise and acquiescence, as in the cases of IB and IC. Additionally, one key element of the pressures which were exerted was the degree of inter-connectedness in the business environment. ERP systems are integrated into the business processes; therefore, they cannot be audited or audit their outcomes separately as their impact on the financial, operational or compliance audit can be isolated. These results are in accordance with Oliver (1991) who shows that the higher the degree of inter-connectedness, the lower the likelihood of using active strategies.

10.7.5 IAF Legitimacy After ERP Implementation

The IAF seeks legitimacy; therefore, the change itself should be legitimated. The internal audit legitimacy was threatened by the misalignment of expectations. These threats led to pressures for changing the practice and the structure of the IAF. The legitimacy of the IAF as a profession rests in part on an assumption that individuals are rational and knowledgeable and motivated to ensure that internal controls are effective to mitigate risks. Based on this assumption, the adapted IAF, in most cases, maintained legitimacy, while in some other cases the IAF tried to maintain legitimacy through serving the management or keeping inherited acceptable roles. In contrast to this Arena and Jeppeson (2010) find that Danish internal auditors derive their legitimacy mainly from being assistants to the external auditors.

According to the institutional change model proposed by Greenwood et al. (2002), events such as ERP systems implementation or governance pressures can destabilise and change IAF practice. These changes precipitated the entry of new players, the ascendance of existing actors or disturbed the socially constructed consensus by introducing new ideas and thus the possibility of change. Then, organisations and IAFs innovated independently, seeking viable solutions to locally perceived problems. New practice was adopted and compellingly presented as more appropriate than existing practice. Therefore, the adapted IAF in most

cases maintained pragmatic or moral legitimacy. The IAF adaptations could be diffused to gain social consensus concerning their pragmatic value (Suchman 1995); thus, they might diffuse even further. Therefore, it is suggested that future research could investigate whether the changes themselves become taken for granted as the natural and appropriate arrangement to reach cognitive legitimacy (Suchman 1995).

10.8 Conclusion

The findings of the cross-case analysis highlight similarities among the four case study companies; however, there were some differences. In this study, the specific feature adopted is the strategic responses (Oliver 1991) of IAF and organisations to the ERP systems, considering that IAFs are subject to rules and regulations to which they tend to conform so as to ensure their legitimacy. Institutional theory (DiMaggio and Powell 1991) is adopted to explain and understand the dynamics of the change in the IAF. The focus, therefore, was on explaining and understanding how the change in the IAF was shaped by both macro- and micro-forces.

Some conclusion can be drawn from these case studies. Internal auditors look upon current technological and governance developments as a golden opportunity to raise the level of expectations about what they can offer and add in terms of value. Nevertheless, they have to be equal to the task. They need to widen their own horizons, keep abreast of rapidly changing technologies, regulations and legislation. The IAF needs to adapt as rapidly as the working environment or it will lose its legitimacy. Recognising the need to change is easier; implementing strategic change is so far the greater challenge.

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11

Conclusion

11.1 Introduction

This book has focused on the adaptation in the IAF's practice and structure as a response to the new control assumptions carried by ERP systems and the increased IAF-related governance pressures, in order to maintain its legitimacy.

This book attempted to address the voids in the literature by proposing and empirically verifying a conceptual framework that can explain the adaptation of the IAF. The proposed framework is based on a consistent set of institutional theoretical perspectives. The conceptual framework can be used as a tool to support organisations and allow researchers to apprehend and analyse the IAF adaptation after ERP systems introduction.

The researchers claim and empirically verify through the cases study that the proposed framework can be used for understanding and interpreting the IAF change and adaptation. The empirical data collected from four organisations in Egypt were analysed using the proposed framework and presented in Chap. 5. In doing this, the proposed conceptual framework was verified and evaluated. Overall, the empirical

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research findings in Chaps. 5 and 6 validated the predictions from the institutional framework. The institutional theoretical lens to study the phenomenon under investigation provided good understanding and interpretations of the practical findings.

This chapter summarises the key findings of the research and draws a conclusion about the contribution and limitations of the study. The final section offers suggestions for future research.

11.2 Key Findings

The key findings are discussed in the context of the research questions.

RQ1. What is the macro-governance pressure associated with the IAF and how do these pressures direct the IAF practice and structure in the sub-organisational level?

- The review of the literature suggested that there is an absence of theoretical frames that describe the pressures on the IAF from external governance pressures and from ERP systems implementation within organisations. The reason for this is attributed to the fact that the link between ERP systems implementation and the IAF is a new research area with many topics remaining unexplored. The researchers reviewed several theoretical perspectives reported in this domain and identified the institutional theoretical perspective as a lens to investigate the phenomenon under study.
- Governance pressures related to the IAF determine the legitimisation criteria for the IAF. The legitimisation of the IAF is to be mainly achieved through the ability of the IAF to provide an internal control assurance and help in risk management.

RQ2. What are the control assumptions of ERP systems that have an impact on the IAF and how do the participants perceive these assumptions?

- The literature review suggested that ERP systems impose a new control principle which threatens the IAF's legitimacy as a governance mechanism.

- ERP systems carry a new institutional control logic, which is based on some investigated interlinked assumptions. These assumptions have affected the IAF as internal auditors are not used to dealing with such assumptions.

RQ3. How has the alignment between ERP systems logic and governance been made?

- ERP systems' control logic and assumptions are, by default, in alignment with the corporate governance goals and objectives. However, some alignment efforts are needed to make the best use of and utilise the ERP systems in enhancing the internal control system. These efforts include:

  – First, preparing a good change management plan, before introducing an ERP system. This plan takes into considerations the adaptation of the IAF, the required training and skills and the risk of resistance to the change.
  – Second, reengineering of process, systems customisation or workaround is needed where appropriate to make the business process auditable.
  – Third, involve internal auditors in the ERP system implementation team from the early stages of the project. This helps in two ways, providing internal auditors with the necessary system knowledge and understanding of the business process through the system; providing the implementation process with the proper advice from a control assurance perspective about the controllability of the process after ERP systems and in making the process auditable.

RQ4. How does the IAF adapt after ERP system introduction and how does this relate to the governance pressures?

- ERP systems introduction causes uncertainty about the acceptability of the IAF's practice and structure. This is because of the new internal control logic and assumptions of ERP systems.

- The IAF adapts as a response to the ERP systems introduction by changing practice and structure, as follows:
  - The scope of the IAF is extended to cover the whole business with more IT-related responsibilities and offers comprehensive auditing with an integrated internal audit plan. When the IAF cannot extend its scope, other professional groups could take over its job.
  - The IA team is increased and turned into an integrated team that gathers a more diverse mixture of expertise, where IT auditors become an essential component.
  - When there are insufficient IT skills in the IA team, the IT auditing is outsourced to an external provider. Then, the IA team is reduced to some comprehensive auditors who are able to audit across functions.
  - Qualified and younger internal auditors are needed to work in the ERP systems working environment.
- The changes in the IAF are dependent on the strategic response adopted by the auditors, which range from acquiescence to defiance. These responses are found to be changing over time. The adopted response is guided by the governance pressures and alignment efforts.

RQ5. How do these adaptations affect the legitimacy of the IAF?

- The adopted IAF's legitimacy-maintaining strategies depend on coercive and normative governance pressures, which give directions about how to maintain legitimacy. Maintaining legitimacy could be through complying with the pressures and adapting to satisfy the requirements of being able to assure the efficiency of controls in mitigating risks or through adhering to the conventional inherited traditions such as working to please the management or inspecting.
- The maintenance of IAF legitimacy was based on aligning new ideas within prevailing normative prescriptions as the right thing to do, thus giving them moral legitimacy, or based on asserting their functional superiority aligning new ideas with self-interested calculations as pragmatic legitimacy.

ERP systems work as a motive for the IAF to change and give indications as to how to change the internal audit practice and structure. Although ERP systems implementation is not by itself the only driver of IAF change, ERP-related control assumptions have changed the business landscape in which the IAF practises.

ERP systems' logic is in line with the ultimate goals of governance and has a significant and direct impact on controlling the business. ERP can be considered as a part of the corporate governance system.

ERP implementation is one of the key factors that forces internal auditors to reassess their practice and structure. Other factors that direct the adaptation are the evolving regulations and audit standards calling for improving the IAF. These forces create a new audit environment and auditors who understand how to adapt their function can be invaluable to their organisations.

ERP systems have eliminated several traditional internal auditing assignments and expanded internal auditors' capabilities. The focus of the internal audit has been shifted from manual detection of errors to technology-based prevention. ERP systems help internal auditors in preventing errors and irregularities through identifying areas of concern when unusual relationships exist. Internal auditors share the methods of effective internal control with users from various departments.

ERP systems implementation increases the scope of the IAF and the need for convergence among financial, operational and IT auditors. In other words, all financial, operational auditors and IT auditors should be part of the one integrated internal audit in order to be able to conduct comprehensive audits effectively. The study reveals that there is agreement that better control assurance results can be achieved when financial, operational and IT auditors' efforts are combined to conduct integrated audits. The IAF provides financial, IT audits, risk management support, consultancy and management support activities. This means that the IAF becomes a service that provides multi-audits. ERP systems implementation accelerates the tendency for the IAF to offer comprehensive integrated auditing.

ERP systems offer tools that are considered to be good resources for internal auditors that should be exploited to obtain information in real time, evaluate access, identify risks and recommend ways to mitigate

them. However, when the IAF is not adapted to benefit from the ERP systems, the IT professionals take over many audit responsibilities.

Governance coercive and normative pressures give legitimatising directions to the IAF adaptation after ERP systems introduction. Therefore, the IAF may maintain its legitimacy through emphasising its ability to offer internal control assurance and risk management after ERP systems introduction. This is through the adaptation to increase the scope to be a comprehensive and integrated IAF. Whenever the governance normative pressures have a negative impact on the IAF, they may maintain its legitimacy through sticking to the traditional accepted normative practice even if this is not the best way to offer better assurance.

Internal auditors realise the significance of aligning their practice with the ERP requirements, because they are under pressure to do better governance and because they are able to get better jobs through mastering the new technology. It could be said that the relationships of internal auditors and ERP system have become increasingly entwined. Missing linkages between the ERP system's capabilities and IAF practice may lead to the inefficiency of internal control activities and even the failure of corporate governance.

The accomplishment of the research objectives, discussed in this section, was made possible after developing a research framework to examine the effect of governance and ERP on the IAF. Thereafter, the novel contributions are stated.

11.3 Contribution of the Study

The elements of the contributions made by this research stem from different components in this book. The reliability of these findings and contributions is enhanced by ensuring its consistency and maximising the repeatability of the research. An auditing approach was developed based on preparing a case study protocol that includes all the procedures applied in the data collection stage, a case study database where the raw data of the case studies are available for external review and records of all interviews for an iterative process of analysis. The findings are transferable, reliable and demonstrate validity through using the replication

logic by testing the results through multiple-case studies (Yin 2009); by developing a thick description to the cases facilitating the comparison with other circumstances (Bryman and Bell 2007, p. 413) and through the analytical generalisation (Yin 2009) by generalising a particular set of findings to a similar circumstances (see Sects. 5.7.5. for more details). The conclusion of the research offers transferable understanding, themes and meanings that can facilitate the understanding of similar settings. This study has suggested a number of contributions at the theoretical, methodological and empirical levels. These can be summarised as follows:

11.3.1 Contributions to Theory

This study contributes to the literature by providing a conceptual framework that explains the factors that determine the IAF adaption following implementation of an ERP system taking into the considerations the corporate governance pressures. This study extends previous literature through exploring the IAF in Egypt as one of the developing countries. This framework can be tested more extensively in Egypt and in other developing countries in order to produce a robust theory in such settings.

This study integrates and extends different institutional perspectives in the introduced framework and then validates it in a different context and a different level of analysis. Institutional theoretical perspectives are used widely on the country and organisational levels; however, there is a room to use these perspectives to understand and interpret empirical findings on the organisation and the sub-organisational levels. Therefore, the basic contribution of this study to institutional theory is an empirical investigation of strategic responses on the organisational level and the sub-organisational level (unexplored analysis level) to institutional external and internal influences. The study empirically verifies the proposed relationships and supports their applicability in the context of ERP, corporate governance and the IAF. The study has significant implications for understanding the change in terms of institutional strategic adaptation theories. The IAF in the sub-organisational level is

subject to macro-level institutional pressures from the related corporate governance rules and regulations and micro-level institutional pressure from the related new institutional logic of the ERP systems.

The study contributes by extending the understanding of the strategic responses suggested by Oliver (1991) that can be used in front of institutional pressures. This study extends this view through finding that there is more than one response which can be used as they are not working as alternatives. The response to certain types of pressure can be changed from one to another over time. Moreover, the study contributes through applying the institutional logic concept in the ERP systems field. The study goes deep to explore the assumptions behind the control principle embedded in the ERP institutional logic.

The research contributed to the literature by attempting to fill the gaps identified in critical literature review. Furthermore, the conceptual framework supported by this research may be a step towards developing a theory of addressing external and internal pressures on the IAF.

11.3.2 Contributions to Methodology

There are insufficient qualitative studies in the field of IAF because of the difficulty in accessing and collecting the data from this sensitive position within organisations, and therefore previous studies mainly collect data quantitatively. This study is among the few studies which were conducted qualitatively and data collected from most of the interested stakeholders either within organisations or external parties. The case study protocol including the interview agenda and questions (see Appendix B) is considered to be a methodological contribution that may guide researchers in following the same methods. The reflection of the institutional framework in the interview agenda may help in analysing and exploring a similar phenomenon. The case study protocol was validated which is a helpful guideline for future researchers.

11.3.3 Contributions to Practice

The findings of this study have practical implications for the ways in which the IAF is managed. The findings of the study may be considered by organisations that implement ERP systems in order to adapt and improve their IAF. It is worthy to note that the implications for the IAF from ERP systems implementation are huge such as: internal auditors have to start handling electronic audit evidence effectively; to gain more understanding of the internal controls in ERP systems and the security of the electronic data; to change the structure of the audit department by adding IT audit professionals and operational auditors from different departments in the integrated internal audit team; to extend the scope of service to cover the whole business and to take responsibilities of adding value to the control assurance and risk management.

Understanding the control assumptions of ERP systems opens the possibility of a deeper level of controllability to activities that had been partially opaque. Internal auditors should understand that after ERP systems implementation control is not a hierarchical, totalitarian and centred practice but rather practice that embraces multiple controls and locations. This means that the internal control assurance became a common concern that might not be only related to the internal auditing territory and there are new control concepts that internal auditors should take into consideration when assuring the internal control system such as the peer-review and the self-review controls.

Taking into account the high level of dependence on ERP systems, no reasonable assurance can be provided without consideration of IT infrastructure. In the ERP systems working environment the IT audit should be an integral part of the IAF. It should collectively assure the validity of the transactions by determining whether there are controls in place and determining the integrity of controls and their susceptibility.

An integrated internal audit should audit the processes and systems across the organisation rather than focusing on individual locations. Instead of conducting separate audits focusing on a vertical analysis of different sets of the controls over the end-to-end process, auditors should depend on horizontal analysis in a way that ensures that all

interconnected controls to address the business risk are addressed in an integrated fashion. It is suggested that the audits should focus simultaneously on an organisation's financial, operational and IT controls and processes. Internal auditors are now considered by the top management as a business partner or even an advisor. Lack of trained and multi-disciplinary staff has become a severe difficulty since IAFs started to assume duties in addition to financial auditing. The broader scope of the performance audit has required integration of various specialised skills.

Internal auditors should have the knowledge of the transactions flow and related controls through ERP systems to ensure the reliability of information. Moreover, they have to adopt risk-based auditing that focuses mainly on the adequacy and effectiveness of internal control activities rather than substantive testing of electronic documents and transactions. The IAF activities should change to eliminate redundancies. Therefore, the execution times of the function's activities should be shorter and the internal audit report should provide more organised and integrated information. Thus, it is suggested that the IAF budget should be increased in order to use CAATs and to take advantage of using ERP systems in the audit practice.

The automation brought by ERP systems raised the importance of automating some of the auditing activities. It is suggested that internal auditors should pay more attention to the segregation of incompatible IT tasks and duties. Clear and strict procedures should be set to prevent IT operators and schedulers from gaining access to programme documentation and databases. Internal auditors should be able to assure the effectiveness of the preventive automated controls, which were absent before ERP systems.

Considering data security as a component of the internal control system is a new concept for internal auditors. Internal auditors should have the knowledge of security utilised in the IT infrastructure to effectively audit the controls around removal of access for terminated or moved employees. They have to understand how access to applications can be given. This will help internal auditors limit unauthorised access. The failure to understand security in conjunction with other controls may cause internal auditors to report issues that have no risk to the organisation.

It is strongly advisable to get experienced internal auditors involved in the implementation team to understand and to ensure that controls are not compromised during implementation. Through understanding of common ERP risks and control, they should improve their skills and knowledge to be strategic governance members.

Using Egyptian cases offers useful policy implications since policy makers need to be informed about the outcomes of the reforms mainly in the wake of the global financial crisis. Therefore, it is suggested that the regulators in Egypt should begin the necessary actions for issuing laws and regulations to force maintaining and adapting the IAF to be a developed profession that takes action in response to technological changes. This is by the aim of emphasising the coercive criteria to legitimise the IAF and set what should be the stakeholders' expectations. It is suggested that governments should play a coercive role by encouraging organisations to maintain a well-adapted IAF that organises its activities to be compatible with its business needs and in the manner specified in internal audit standards. There should be more powers given to shareholders to remove ineffective internal auditors. Furthermore, the shareholders should be made aware of the importance of the IAF so that the recommendations of internal auditors and actions of the management are taken in the right perspective. Regulators in Egypt should take action to legalise and improve the Egyptian code of corporate governance in order to develop the internal audit profession and enhance its role and organisational status.

Professional bodies such as the IIA should modify the required competencies and skills set for internal auditors to highlight the normative criteria of legitimisation. These are needed for internal integrated auditing to be consistent with the evolution occurring in the structure and practice of the IAF within organisations that implement ERP systems and to give it the cognitive legitimacy. The IAF should be given recognition as a profession. This requires formal training and continuous professional education. The authority for the IAF should be delegated in written format and communicated to all concerned. It is suggested that associations can legitimate IAF change by reframing professional identities as they are presented to others outside the profession. There is a need for a professional body that looks after the interests of the internal

audit profession in Egypt. In Egypt, there is still ambiguity regarding the objectives, scope and nature of the internal audit. Internal auditing needs clearly outlined statements of responsibilities and objectives.

It is suggested that the ESAA should act to encourage wider awareness of the importance of the IAF and its benefits and play a better role in offering thorough support for training and professional development to enhance the profile of the IAF. The IIA chapter in Egypt should have sufficient power to promote and establish internal audit departments. The ESAA could liaise with the IIA chapter for disseminating the CIA examination in Egypt.

Furthermore, internal auditing courses in Egyptian universities should be modernised to include the international standards. It is essential that universities in Egypt review the material used in teaching internal auditing. Currently, internal auditing is merely a topic covered among many other topics and only the financial aspects of internal auditing are studied. This syllabus needs to be improved to allow covering the international standards and the needs of the new ERP systems working environment.

Educational programmes should be developed to be adjusted to the changes that are occurring in the field of auditing. It is vital to understand the changes taking place in assurance services. It is recommended that the auditors' ability to gather information, to examine, to evaluate and to communicate must be taken into account along with the growing technological complexity of ISs. There is a necessity for practical and scientific retraining for the internal auditors in order to assimilate the principles and criteria of governance in the new ERP working environment. The IAF, besides looking at the compliance side, has to be dynamic, staffed by highly qualified individuals and be a value-adding function.

11.4 Research Limitations

There are some limitations which are worth noting as they open up fruitful avenues for future research. The results must be interpreted with caution, given the limitations imposed by the research methodology and

the complexity of the issues involved. Even though a lot of effort was invested to minimise these problems, the limitations on the implications of the results must be kept in mind.

The generalisation achieved in this research is on the theoretical level as the framework is verified to be used on other contexts. However, a limitation of the qualitative research methodology is the difficulty to generalise results from the cases study. Using a case study strategy made the external generalisation of the findings limited. The adoption of case study research reduced the number of organisations which could participate. However, these limitations were overcome through reasoning made by drawing on other literature and case materials (Walsham 1995).

Despite the advantages the qualitative research provides, this methodology has disadvantages as well, such as being time-consuming, in that the researchers spent more than one year in the process of data collection and analysis. A large amount of data were collected from the four cases and transcribing and translating consumed a lot of time as many interviews were in the Arabic language. The relative difficulty in analysing this data did not invalidate any conclusion drawn, since analysis was applied to data obtained from multiple-case studies.

The data were collected within 12 months of ERP system implementation, while the comprehensive control benefits of ERP systems may take a longer time to be gained and the ultimate adaptation of the IAF may take a longer time to be finalised. Therefore, it is important to take into consideration this timing of data collection when interpreting the study findings.

There is potential for some bias regarding the way cases and interviewees were eventually chosen. The researchers did his best to choose the cases based on phenomena representative matters; however, accessibility to the field was an important determinant. The selected cases were chosen based on the recent implementation of an ERP system and of having a well-established IAF. The cases were from two different sectors, banking and manufacturing, and from two different categories, national and international in order to be subject to different corporate governance pressures. Even though the number of cases investigated during this study was four, to extend it further would not have increased the

external validity. Although the research context is specific, it is believed that the findings are of relevance to inform other sectors and other countries. This is justified based on that there are no specific requirements for the IAF in different sectors and that the ERP system is a readymade package.

Qualitative research is criticised for its inability to establish a scientific link between theory and research. The interpretation was difficult and hard to be achieved without controlled and minimised degree of bias. However, this concern was addressed through many strategies discussed in Sect. 4.7.5, such as developing a theoretical framework to guide the interpretations, using replication strategy and using data triangulation. To minimise bias, data were shared with peers to open the mind to alternative explanations. The researchers avoided a biased intervention in the process of the data collection as much as possible. This was to separate the participants' responses from the researchers' opinions so that the data represent interviewees' experience accurately and precisely.

Even if the results from this research have limitations and cannot be regarded as generally applicable, some conclusion could be drawn from this case study, contributing to the achievement of a deeper understanding of internal audit issues in the ERP system working environment. Since this is an exploratory and analytical study, it is a starting point for further research in this area. It is hoped that the research will form the basis for further more specific research and investigation relevant to the issues highlighted in this study.

11.5 Recommendations for Further Research

Although the researchers have a prolonged engagement with the cases and data collection phases, such research requires a longitudinal method to avoid any limitations which stem from the retrospective data collection methods. This research is conducted within a specific time period with a snapshot nature of research methodology and does not consider the changes over a longer time. This represents a worthy route of inquiry for future scholars. Future research is recommended to consider

the longitudinal type of study of the legitimacy of the IAF over time. Such future longitudinal studies may improve the robustness of the results presented in this study.

Whereas the study offers various interesting and novel insights, the limitations draw attention to the need for more research adopting different methods and targeting different populations and participants to investigate the wider prevalence of the findings. Longitudinal studies are important in terms of further research. As noted earlier, the responses of internal auditors are unlikely to stay stable over the operational life of ERP systems. It is probable that ERP systems will be reinterpreted, which may necessitate redefining functional boundaries. The in-progress nature of the relationship between ERP systems' logic and the subjective interpretations of internal auditors, underscores the need for longitudinal studies to explore how well the proposed theoretical model reflects realities in the longer term.

The qualitative approach taken by this study leaves scope for future research using quantitative research methods, such as a questionnaire survey in order to increase the reliability of the findings. It would also be fruitful to design research to increase the generalisability of the findings by testing the conceptual framework more widely in other countries in the Middle East and elsewhere.

The findings of this study confirm the relevance of the corporate governance institutional pressures and ERP systems' institutional logic in determining changes in the IAF; however, the results also highlighted the influence of further elements such as organisational culture. The extent to which this change will lead to a growth in internal auditing and will be legitimated in the long run is a subject for further research.

In this book, the IAF changes gain pragmatic and moral legitimacy. The IAF adaptations could be diffused to gain social consensus concerning their pragmatic value (Suchman 1995); thus, they might diffuse even further. Therefore, it is suggested that future research could investigate whether the changes themselves become taken for granted as the natural and appropriate arrangement to reach cognitive legitimacy (Suchman 1995).

There is also a great need for more comparative studies of the perception and practice of internal auditing between different developed

and developing countries in the ERP systems working environment. Further research is needed to investigate the obstacles to adapt internal auditing in developing countries and ways to solve any difficulties that might hinder the practice of internal auditing in its wider scope. Future research conducted in different national environments would verify the findings of this study and may yield additional interesting and complementary insights. Conducting future studies would enable researchers to obtain an overall picture of the phenomenon or perform a comparison.

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Appendices

Appendix A: Case Study Protocol

A.1 Introduction

A case study protocol contains the procedures followed. It was formed before the data collection. Yin (2009) offers the protocol as a key factor in emphasising the reliability of the case study. It is recommended to think about what data need to be collected from whom, how it will be collected and why (Miles and Huberman 1994). Interview questions as well as a list of required documents were prepared (Benbasat et al. 1987).

A.2 Case Study Protocol Outline

1. Overview of the case study research.
   - The research aim.
   - The research objectives.
   - The research importance.
   - The field context.
2. Research instrument
3. Participant Consent Form and the participant information sheet.

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A.3 Overview of the Case Study Research

In the ERP systems environment, the IAF faces significant challenges to add value through improving risk management, internal control and governance process as a whole. Therefore, it needs to be considerably adapted in terms of structure and practice. We have very limited understanding of the nature of these changes which requires further research.

It is important to understand and interpret the IAF adaptation as responses to the ERP systems implementation in order to improve its effectiveness as a governance activity. The study seeks to illuminate how the internal audit practice and structure change as a respond to ERP system implementation (micro-level) embodies broader assumptions and constructions linked to the governance environment (macro-level). The focus of the study is therefore on explaining and understanding how the change in the IAF is shaped by both exogenous and endogenous forces.

The research ***aims*** to increase the understanding of how to maintain the IAF legitimacy as an important actor of the governance processes in the ERP systems environments. In order to achieve this aim, the research investigated the IAF change phenomenon from different aspects.

The main ***research question*** addressed in the study is: How is the change in the IAF shaped by the interplay between institutional forces of ERP systems and corporate governance? Therefore, the case research ***objectives*** are to investigate the related issues and topics such as the following:

1. What are the governance rules and regulations that govern the IAF's structure and practice? How they govern these aspects?
2. How does the implementation of ERP systems affect the IAF's structure and practice?
3. What are the main problems that face the IAF after the ERP systems implementation? How do these problems relate to the mismatch between the ERP systems requirements and the governance rules?
4. Why does the IAF need to be changed after the implementation of the ERP systems? What are the main aspects in the structure and practice of the IAF that changed? Or need to be changed?

5. Does the IAF play the main role in the risk assessment and control assurance in the ERP systems environment?
6. How is the IAF considered as a governance actor in the ERP systems environment?

The ***significance*** of conducting this research comes from three directions:

1. The importance of the ERP systems as new information systems that impose new risks and control problems on the organisations which implement it, due to its complexity, integration and the possible misalignments between its logics and the procedures in use.
2. The increased emphasises on the importance of effective corporate governance practice, especially after the repeated corporate scandals and the global economic crisis.
3. The increasing emphasises on the importance of effective IAF as assurance and consulting activity designed to add value and improve an organisation's operations. It helps an organisation accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control and governance process.

In order to answer the ***research question***:

> How should the IAF change as a response to the ERP systems implementation in order to secure its legitimacy as a corporate governance tool which adds value?

The ***field context*** of conducting this research was four case studies in Egypt in two sectors, two cases in the banking sector and two in the manufacturing sector. Two case studies conducted in international organisations while the others in national organisations. This was done by the purpose of comparing the phenomenon under investigation in one of the developing countries between the sectors and the local and international organisations.

A.4 The Research Instrument

To collect the needed data different sources of information were used. The main data sources are interviews; thus, it is essential to determine who to interview. According to the principle of multiple interpretations (Klein and Myers 1999) and requirements for data triangulation, it was planned to interview different informants within the case organisations and some external parties. Where possible, most of the individuals who are related to the ERP systems, corporate governance and the IAF were interviewed. In each organisation, the people who were most likely interviewed are:

- Chief internal audit (CIA).
- Internal auditors (involved any other individuals who are responsible for internal control assurance or risk assessment).
- ERP systems managers.
- ERP system vendor.
- External auditors (corporate governance main actors).
- IT auditors (internal or external).
- Consultants.
- Accountants.
- Financial managers.
- Others mentioned by interviewees who are/were involved in ERP systems implementation.

In each of the four case organisations, it was planned to interview individuals from different levels, as mentioned before. There was awareness that in some cases, it is possible to identify other employees who do IAFs but not belong to the internal audit department. It is important to differentiate between the interview-specific questions asked to specific interviewees and the questions asked to interrogate documents. There are three tactics in how to sequence questions (Hermanowicz 2002): the first questions are often introductory and easy to answer; difficult questions are placed in the middle of the interview and an interview end on a positive note.

As well as interviews, some documents, reports and archival data were collected. These documents are about:

- The organisation's history and goals of implementing ERP systems.
- The ERP systems implementation plan.
- List of people who are involved in the ERP systems review.
- The internal audit job description, report, structure and practice.
- The internal audit reports.
- Corporate governance rules regarding risk and control and governance rules regarding the internal audit function.
- The external audit report.

Finally, some observations were done to observe the internal auditors behaviour, while doing their functions and their relation with other departments.

Appendix B: Interview Agenda

The study mainly used the semi-structured face-to-face interviews. Semi-structured interviews draw on open-ended questions prepared before data collection to get detailed information and facilitate comparison across cases; nevertheless, the interviewer remained flexible. The interview agenda served as a guide on which the interview was built but that allows creativity and flexibility. The potential participants were sent a copy of the interview agenda before the interview took place. Consequently, they know what they will be asked about. They can be prepared to discuss their experiences as they relate to the topic of research.

Most interviews were at the interviewee's office; however, there were as well informal meetings with some key informants outside the working environment. Interviews were lasted for around 60 min. In some cases, there was access to interviews for longer period of time. Some interviews were in English, and others were in Arabic that was translated later into English.

It has been suggested by qualitative researchers that in-depth interviews are best to be recorded (Patton 1990). This permits the interviewer to be more attentive to the interviewee by maintaining eye contact and showing attention in what is saying. This is an essential part of increasing the accuracy of the data collection process and helped the researchers not to lose direct quotes. Participants were always anonymous. Subsequently, the recorded interview was destroyed. Those who might simply feel nervous by the existence of a recorder, like most people, quickly forgot that the recorder is even there.

Questions were divided into six groups:

- Group 1 related to the corporate governance impact on the IAF and the use of IT.
- Group 2 related to the ERP systems logics.
- Group 3 related to the mismatch or the misalignment between the ERP systems logics and the corporate governance rules.
- Group 4 related to the IAF change as a response to ERP systems implementation and corporate governance rules and the misalignment between them.
- Group 5 related to the IAF role in the internal control and risk assessment in the new ERP systems working environment.
- Group 6 related to the IAF legitimacy as a corporate governance actor in the new ERP systems working environment that add value.

To collect data for each group, the interviews with people from different departments and organisational levels were necessary. Due to the complexity of the problem, it was impossible to collect all the data from one person within the organisation. Therefore, interviews with staff members and outsiders were necessary.

The interview agenda includes questions used during the interviews. They used as a guide to gather factual information. The first set of questions resulted in general information about the organisation. The second set of questions elicited detailed data on the IAF and the ERP systems. The first set of questions is to get respondents talking; they were asked to describe their experience with the ERP

systems and the IAF according to the position of each informant in or out of the case organisation. Then, the main questions were asked and at the end concluding questions that are easier to answer followed by a sincere thank you at the very end as: "*You've been very helpful; I really appreciate the time you've taken to talk with me. Thank you very much*". After the actual interview, a thank you note was sent to the respondents regardless of whether the interview went well or not.

Part of good sequencing involves having a good introduction which includes: thanking the interviewee for accepting to participate in the research, explaining the purpose and value of the research, explaining the ethical concerns, seeking permission to tape-record the interview, as follows:

> This is a study about the IAF change after the implementation of the ERP systems. The questions I would like to talk about deal with the ERP systems impact on the internal control and risk with the organisation, how that affect the legitimacy of the IAF as a corporate governance effective tool and how to improve this function to add value. The questions will need that you to reflect upon yourself and make personal judgments that will touch various professional and related personal topics. Your participation is strictly confidential. Interviews are normally tape-recorded, and this is simply for accurately keeping track of information. Subsequently the tape will be shattered. Your participation in this study is important. However, should you at any time wish to stop, you may do so and at any time you should feel free to ask me questions concerning the interview or the study. May we begin?

B.1 The E-Mail Sent to Participants

We obtained your contact details from searching the Internet for organisations in Egypt using ERP systems. ERP systems for example include SAP and Oracle. In case of the unavailability of ERP in your organisation, an e-mail from you informing the researchers will be appreciated as well any other relevant communication. This would enable us to promptly remove your contact from our list of organisations with ERP systems before a reminder is sent out in the future.

This research is a part of a study at Brunel University, UK. There is a contradictory debate about the impact of the ERP systems on the internal control and risk management and the ability of the contemporary internal audit function to exploit these systems in enhancing the corporate governance process. Corporate governance is defined as "*processes deal with the procedures utilized by the representatives of the organization's stakeholders such as (internal auditors) to provide oversight of risk and control processes administered by management. The monitoring of organizational risks and the assurance that controls adequately mitigate these risks both contribute directly to the achievement of organizational goals and the preservation of organizational value. These performing governance activities (internal auditors) are accountable to the organization's stakeholders for effective stewardship".*

Therefore, the study concerns with exploring the internal audit function change to use ERP systems for improving the corporate governance process. Recently after the repeated corporate scandals and the financial crisis, many organisations face corporate governance pressures to improve their monitoring activities. Moreover, many organisations across the globe have spent huge sums of money in implementing these systems assuming that they offer benefits to enhance corporate governance. Yet reports from some parts of the world suggest that the benefits from the use of such systems may be questionable. One plausible reason for the conflicting information might be related to the ignorance of the very important function that is the cornerstone of the corporate governance process and the most interested function in the IT infrastructure within the organisation.

Thus, we are selecting ERP adopting in Egypt. In this regard, your assistance is sought in gathering the relevant information that we require through an interview. You may forward this e-mail to persons whom you know could assist us. As a token of gratitude for your time, we would like to share the finding of our research with you even you are unable to participate.

Most importantly, your responses will be handled with strict confidence. Please note that no individual response is identified. Thus, by agreeing to participate in the study, you are indicating that your

response is confidential. The interview will take about 45–60 min of your time.

If you have any additional comments, do not hesitate to contact the researchers.

Sincerely

The researchers

B.2 Participant's Personal Information Sheet

The interview code:

Date of the interview:

Time:

Participant's Personal Information Sheet

Participant's name:…….

Participant's occupation:……

Participant's education and qualifications:……..

Length of experience in organisation :…….. (year)

Age:…… Gender……..

E-mail:…….

Telephone:……..Extension……

General information of the organisation

- Name of the organisation:
- Year of establishment:
- Position of the organisation in the industry:
- How many local branches have your organisation? ☐ Are they integrated?
- How many global branches have your organisation? ☐ Are they integrated?
- When did your organisation start to implement the ERP system?
- When did the implementation end?
- How many ERP systems modules are implemented in your organisation? What are them?
- Do you use the ERP software in your own tasks?

B.3 Interview Schedule by Interviewees

For the ERP Systems Vendor

1. How do you identify the ERP systems?
2. What are the main reasons and motivations for organisations to implement ERP systems?
3. What are the goals and values which guide the ERP systems' embedded practice?
4. What is the impact of ERP systems on the information processing environment, internal control and risk management before, during and after the implementations?
5. How ERP systems take into consideration the corporate governance rules and regulations related to the business environment of the implementing organisations in different sectors? How do you perceive the ERP systems as a means of changing the corporate governance process?

6. How do you align the best practice embedded in ERP systems with the practice in the implementing organisations? What are the main areas of misalignments? How do you encounter the challenges caused by these misalignments? How do you see that the ERP systems goals align (or misalign) with the corporate governance process? Why?
7. How can the high level of integration, standardisation, automation, visibility, best practice and complexity of the ERP systems affect efficiency and control of the operations within organisations?
8. What are the probable risks that organisations may face after implementing the ERP systems? How do you help in assessing these risks?
9. What are the main internal control problems which organisations face after implementing ERP systems? How do you help them solve these problems? To what extend do you see that internal auditors understand these solutions?
10. What are the main built-in controls available in the ERP systems for the implementing organisations? Are the organisations choosing what control to switch on or the vendor imposes a set of controls?
11. How ERP systems affect the aim of the internal control regarding whether it should be based on preventive controls or detective controls? Why?
12. How does the implementation of ERP systems have an impact on organisations ability to provide an adequate system of internal control?
13. Are ERP systems offer internal auditing tools for more timely and ongoing assurance that internal control system would work effectively and risk is properly mitigated?
14. What are the tools offered by the ERP systems to support internal audit procedures to oversight risks and controls?
15. What is the nature of internal auditors' involvement in the implementation and subsequent use of these systems?
16. What are the auditing features embedded in the ERP systems? How do you support internal auditors to use these features?

17. What do you expect in the IAF within the implemented organisations in order to utilise the ERP systems features?
18. Do you see that ERP systems improve the internal auditors' capabilities by offering the main infrastructure for automating the audit process to be continuous audit? Increase their respect? And reduce conflict with other parties?
19. *Do you have other issues you would like to share in regard to the internal audit function?*

For the ERP Systems Manager, IT or IS Professionals

1. Could you please describe your experiences with ERP systems implementation (reasons, motivations or contextual pressures)? Did the internal auditors have any role to play during the implementation process?
2. What were the challenges during the ERP systems implementation? Was there any tension with the rules and regulations that govern the organisation activities?
3. What is your view on this statement "ERP systems' goals, standardisation, integration and routine of business process align (or misalign) with the corporate governance process"? Why?
4. What are the new risks that your organisation faces after implementing the ERP systems? Who is the responsible party for risk assessment? What is the role of the internal auditors?
5. What are the controls in place to mitigate these risks? Who is the responsible for assuring the adequacy of these internal controls? What is the role of the internal auditors?
6. Who is the responsible for reviewing documentation for business processes; evaluating controls embedded in applications such as ERP systems; testing the interfaces between these systems; reviewing audit logs of transaction processing; testing the accuracy and validity of data in databases; reviewing and testing access controls to applications, databases and networks; and evaluating the status of systems development projects?

7. How ERP systems affect the internal control regarding whether it should be based on preventive controls or detective controls?
8. How does the implementation of ERP systems have an impact on your organisation ability to provide an adequate system of internal control?
9. To what extend do you see that ERP systems enhance the risk management, control and governance process in your organisation?
10. What is the nature of the working relationships with the internal auditors? Is there a differentiation between who is doing the IS, IT audit and these who do the financial, operational auditing? Or the IS audit and IT audit specialists become an integral part of the internal audit function? Or enhanced auditor training and part time integration of IT audit specialists become the norm?
11. What do you expect in the IAF structure and practice in order to add value within the ERP systems working environment? In terms of its source, budget, skills, size, services provided, tools in use, position within the organisation and relationships with IT persons and external auditors.
12. How do the internal auditors get secure and timely access to the data which is object to audit? What are the IT data analysis solutions used by the internal auditors to manage massive file sizes?
13. How do you see the internal auditors understand the security control aspects in an ERP system and considering it as useful? (User authentication, separation of duties, accessibility, time restriction, authorisation, security policy, logging and integrity of data)
14. Are internal auditors likely to expand their roles and expertise in the field of business and IT?
15. Are IS professionals who are going to broaden their activities and competencies in the traditional preserve of internal auditors?
16. *Do you have other issues you would like to share in regard to the internal audit function?*

For the Chief Internal Auditor

Corporate governance pressures

1. What are the applied corporate governance coercive rules and regulations (such as governmental standards, politics and directives or from Basel committee) and professional rules and regulations (such as the IIA standards) that govern the IAF's structure and practices (In terms of sourcing, budget, skills, size, services, tools, position within the organisation and the relation with the external auditors)?
2. How do you see the effectiveness of the IAF in your organisation in comparison with the other organisations in the same sector?
3. How corporate governance rules shape the internal control practice, the risk management practice and the internal auditors' role in assessing risks and assuring that the controls are adequate to mitigate these risks?
4. Does the effort to improve corporate governance lead to using continuous auditing by internal auditors to provide assurance on demand?

ERP systems new requirements

5. What was the role of the internal auditors in ERP systems implementation process?
6. What are the new requirements in the IAF in the new ERP systems working environment? Does the internal audit department have the sufficient resources and experience to fulfil its function in the ERP systems environment?
7. Who is responsible for evaluating controls embedded in ERP systems applications; testing the interfaces between these systems; reviewing audit logs of transaction processing; testing the accuracy and validity of data in databases; reviewing and testing access controls to applications, databases and networks; and evaluating the status of systems development projects?

Tension

8. How do you see that the ERP systems goals align (or misalign) with the corporate governance process? Why? Do you consider the ERP systems as a mean of changing the corporate governance process?
9. How can the standardisation, integration, rationalisation and routine of business process offered by the ERP systems enhance or incongruent with the corporate governance efforts?
10. What are the organising principles that guide the internal audit function? Are they related to the ERP systems, the corporate governance or both? How?
11. Do you see the relation between ERP systems and corporate governance in relation with the internal audit functions as: contradictory; complementary; two potentially inconsistent logics are applied to different domains, and thus never conflict.

IAF Structure and practice before and after ERP systems implementation

12. How did the ERP systems change the design of the IAF's structure, practices and communications within the organisation? Could you please describe the following points before and after the ERP systems implementation to clarify the ERP systems impact: The IAF's sourcing, budget, skills, size, services, tools, position within the organisation and the relationships with the external auditor.
13. To what extend do the standardisation, integration, rationalisation and routinisation of the ERP systems help or challenge the internal audit function?
14. To what degree is the current IAF computerised in your organisation? Could you please express the role of IT in changing internal auditing techniques?
15. Did your organisation adapt any modern internal auditing techniques (such as CAAT or any continuous auditing software) in the past few years? Why? Did the ERP systems availability influence the introduction of these techniques? How?

16. Do you use any embedded audit modules? What are the major obstacles to implement continuous auditing?
17. Do you see that the ERP systems provide the infrastructure necessary for the effective evolution of the IAF to be an ongoing assurance process?
18. How do the internal auditors get the access to the data which is object to audit? What are the IT data analysis solutions used by the internal auditors to manage massive file sizes and to deal with secure and timely data access?
19. In the new ERP systems environment, is the IAF likely to expand its roles and expertise in the field of business and IT? Or, instead, is it IS professionals who are going to broaden their activities and competencies in the traditional preserve of internal auditors?
20. Is IT audit specialists become a permanent integral part of the internal audit team? Or enhanced auditor training and part time integration of IT audit specialists become the norm? Is the IS audit an integral part of the internal audit function?
21. Did the use of ERP systems increase the comprehensiveness, accuracy, regularity and timeliness of internal auditing information?

Risk and control before and after

22. What are the new risks you assess after the implementation of the ERP systems? How do you see these risks are different from before ERP systems?
23. How do the internal auditors assess risks? (Recognising the range of risks in the ERP systems being audited; connecting the identified risks with potential applications; determining the annual cost of each relevant ERP exposure; selecting relevant cost-effective internal controls for the differential ERP exposures; advising the management on optimal resource allocation; anticipating and suggesting integrated responses to risks; and providing risk management advice). What are the tools in use?

24. What are the new internal controls you give assurance about after the implementation of the ERP systems? How do you see these are different from before ERP systems? Are ERP systems creating the demand for more timely and ongoing assurance that controls are working effectively and risk is properly mitigated?
25. How are internal auditors providing internal controls assurance? By observing business processes and verifying whether the observations compatible with the proposition that a control exists, correct and functioning? By using preventive controls that attempt to execute a prohibited behaviour to verify that such behaviour cannot take place? By retrieving the control settings stored in the enterprise system and verifying that they match what has to be?
26. Do you offer continuous risk assessment (identify and evaluate companywide risk levels by examining trends in the data-driven risk indicators) or continuous control assurance (monitor transactions against a set of control rules to determine whether the internal controls are functioning as designed and to highlight exceptions)? How?
27. Do you think the implementation and use of ERP systems enhance the transparency of user's activities?
28. Do you see that the visibility and best practice offered by the ERP systems enhance the control of your organisation's operations? How? By offering more transparency across the whole business process and making individuals' actions visible, through standardised and information accessibility that makes any deviation from the norm visible; by constraining the range of opportunities for individual choice.
29. How do you see the security control aspects in an ERP system useful? (User authentication, separation of duties, accessibility, time restriction, authorisation, security policy, logging and integrity of data)
30. Have the implementation and use of ERP systems reduced the time spent on and improved the information related to internal control assurance and risk assessment?

Legitimacy

31. What are the reasons for conformity or resistance to the requirements of corporate governance and the ERP systems?
32. Do you expect that compliance increases the IAF's status or image?
33. How compliance or resistance might affect the efficiency of the internal audit function?
34. How does the IAF gain a social support?
35. To what extent do you see that the IAF fulfils internal and external commitments?
36. To what extent does the IAF get access to the needed resources?
37. To what extent do you see that the IAF can help achieve the corporate governance goals?
38. Are you satisfied with the present internal audit function? If not, what you would change? What are the big challenges?
39. *Do you have other issues you would like to share in regard to the internal audit function?*

For Internal Auditor

1. How corporate governance rules shape the role played by the internal auditors in the internal control and the risk management?
2. Do you consider the ERP systems as a means of changing the corporate governance process?
3. How did the implementation of ERP systems affect your organisation's ability to provide an adequate system of internal control that mitigates new risks?
4. What are the organising principles that guide the IAF activities? Are they related to the ERP systems, the corporate governance or both? How?
5. What are the changes that took place after the ERP systems implementation in the following:

- What is the new set of skills that internal auditors need?
- What is the new set of IT tools that internal auditors need for assuring the internal control effectiveness and for assessing new risks?
- What are the new relations that internal auditors have within the organisation, such as with the IT, IS persons, audit committee and board of directors? How do you communicate with IT department and audit committee after ERP system implementation?
- Is the IAF fully in sourced, co-sourced or outsourced? Why?
- How did the IAF's budget change after the ERP systems implementation? Why? How the use of new technological tools affects its budget? How the changes in the number of internal audit staff affect the budget? How the changes in the source of internal audit staff affect the budget?
- How did the IAF's size change after the ERP systems implementation? Why?
- How did the activities which performed by the internal auditors shift after the ERP systems implementation? Why? (Financial audit, operational audit, IT audits, quality audits, support in control risk, consulting activities and management support).
- How did the internal auditor's relationship with the external auditors change after the ERP systems implementation? Why? (No relation, sharing plans, joint planning, external auditor monitors internal audit, internal audit monitors external auditor, reports are shared between the two or internal audit has to work according to external auditor requirements)

6. To what extend do the IAF's structure and practice align (or misalign) with the standardisation, integration and routinisation of the ERP systems?
7. Did ERP systems change the relationships between internal auditors and managers, external auditors and IT department in terms of increased respect for the former and reduced conflict?

8. Are internal auditors likely to expand their roles and expertise in the field of business and IT? Or, instead, is it IS professionals who are going to broaden their activities and competencies in the traditional preserve of internal auditors?
9. Is IT audit specialists become a permanent integral part of the internal audit team? Or enhanced auditor training and part time integration of IT audit specialists become the norm? Is the IS audit an integral part of the internal audit function?
10. Do you agree that the ERP systems provide the infrastructure necessary for the effective evolution of the IAF to be an ongoing assurance process?
11. Did the implementation and use of ERP systems increase the comprehensiveness, accuracy, regularity and timeliness of internal auditing information? Improved the information related to internal control assurance and risk assessment?
12. Did the implementation and use of ERP systems increase the visibility of user's activities?
13. How do the internal auditors assess risks? What are the tools in use?
14. What are the main controls in the ERP system environment? Preventive controls or detective controls? How do you assure these controls? What are the tools in use?
15. Are ERP systems creating the demand for more timely and ongoing assurance that controls are working effectively and risk is properly mitigated?
16. How do the internal auditors get the access to the data which is object to audit? What are the IT data analysis solutions used by the internal auditors to manage massive file sizes and to deal with secure and timely data access procedures?
17. To what degree are current internal audit computerised in your organisation? Could you please express the role of IT in changing internal auditing techniques?
18. How do you see that the IAF can help achieve the corporate governance goals?
19. How can the IAF use the ERP systems in supporting their corporate governance role?

20. Are you satisfied with the present internal audit function? If not, what you would change? What are the big challenges?
21. *Do you have other issues you would like to share in regard to the internal audit function?*

For the External Auditor

1. How corporate governance rules shape the internal control practice and the risk management practice and the role played by the internal auditors in the internal control and the risk management?
2. How the ERP systems shift the risk-control landscape and the corporate governance practice related to the internal control and risk management?
3. Do you consider the ERP systems as a way of changing the corporate governance process?
4. How do you see that the ERP systems goals align (or misalign) with the corporate governance process? Why?
5. Do you see the relation between ERP systems and corporate governance in relation with the IAF as: two potentially inconsistent logics are applied to the same domain and cannot simultaneously guide the internal audit without fundamentally changing it (contradictory); two logics are applied to the same practice, and these practices can be guided by these logics with some changes without the dissonance (complementary); two potentially inconsistent logics are applied to different domains, and thus never conflict.
6. Are ERP systems creating the demand for more timely and ongoing assurance that controls are working effectively and risk is properly mitigated?
7. Could you please describe the internal audit functions in organisations before implementing the ERP system and compare with today, in terms of structure and practice?
8. Did ERP systems improve relationships between internal auditors and external auditors in terms of increased respect for the former and the depending upon their work?

9. How do you see the image of the IAF with the organisation?
10. How does the IAF gain a social support?
11. How does the IAF fulfil internal and external commitments?
12. Has the IAF gain the acceptance in professions? How?
13. How can the IAF change to better use the ERP systems in enhancing its corporate governance role?
14. Are you satisfied with the present internal audit function? If not, what you would change? What are the big challenges?
15. *Do you have other issues you would like to share in regard to the internal audit function?*

For the Head of the IIA Chapter

1. How do you see that the IAF can help achieve the corporate governance goals?
2. How the practice guided by corporate governance rules and regulations implies internal auditors identities and domain?
3. What are the applied corporate governance coercive rules and regulations (such as governmental standards, politics and directives or from Basel committee) and professional rules and regulations that govern the IAF's structure and practices?
4. How do you see the effectiveness of the IAF in this country in comparison with other countries in relation to the banking sector?
5. Why are organisations being pressured to conform to corporate governance rules or expectations? (Legitimacy or efficiency)
6. To what requirements are organisations being pressured to conform?
7. How or by what means are the corporate governance pressures being exerted?
8. What are the characteristics of the banking sector business environment in this country within which corporate governance pressures are being exerted? (Environmental uncertainty or environmental interconnectedness)

9. How corporate governance rules shape the internal control practice and the risk management practice and the role played by the internal auditors in the internal control and the risk management?
10. Do you consider the ERP systems as a way of changing the corporate governance process?
11. Do you see the relation between ERP systems and corporate governance in relation with the internal audit functions as: contradictory; complementary; two potentially inconsistent logics are applied to different domains, and thus never conflict.
12. How the ERP systems changed the design of the IAF's structure, practices and communications within the organisation? Could you please describe the following points before and after the ERP systems implementation to clarify the ERP systems impact: the IAF's sourcing, budget, skills, size, services, tools, position within the organisation and the relationships with the external auditor.
13. Do you agree that the ERP systems provide the infrastructure necessary for the effective evolution of the IAF to be an ongoing assurance process? (Through the integration of continuous auditing applications)?
14. How can the internal auditors benefit from implementing the ERP systems to enhance their role in internal control, risk management and corporate governance process?
15. How do you see the prestige of the IAF within organisations?
16. How does the IAF gain a social support?
17. How does the IAF fulfil internal and external commitments?
18. To what extent does the IAF get access to the needed resources?
19. Has the IAF gain the acceptance in profession? How?
20. Are you satisfied with the present internal audit function? If not, what you would change? What are the big challenges?
21. *Do you have other issues you would like to share in regard to the internal audit function?*

Interview closing:

Thanking the interviewee again for participating in the research.

Asking for any documents that are related to what is discussed in the interview.

Asking for permission to contact the interviewee later in case of further clarifications needed and the suitable way of contacting.

Asking to recommend other probable informants who are supposed to be knowledgeable in the research topic.

Appendix C: The Categories and Coding Scheme

C.1 Corporate Governance Institutional Pressures

Numerous standards and legal requirements address the internal audit process directly or the internal control structure of organisations. Corporate governance as an institution has the three kinds of institutional pressures: coercive, normative and mimetic pressures . Those pressures are control mechanisms exerted on organisations to constrain their behaviour. Responses to institutional pressures towards conformity depend on why these pressures are being exerted, who is exerting them, what these pressures are, how or by what means they are exerted and where they occur. The five institutional antecedents are cause, constituents, content, control and context.

Coding rules: any piece of text that expresses explicitly or implicitly rules, standards or regulations that govern the internal audit function could be coded under one of the following ***codes***:

A. Coercive pressures (legal standards, regulations, required education or training and directives).
B. Normative pressures (through professionalisation, inter-organisational networks, social obligations through values and norms).
C. Mimetic pressures (internal auditors tend to copy others they consider to be leaders in other organisations).

D. Cause (why these pressures are being exerted).
E. Constituents (who is exerting them).
F. Content (what these pressures are).
G. Control (how or by what means they are exerted).
H. Context (where they occur).

C.2 ERP Institutional Logics in Controlling Business

Institutional logics define the content and meaning of ERP systems as an institution. Institutional logics act as organising principles that guide activities and thus embody the goals, norms and values of the institution. Responses to institutional pressures towards conformity depend on why these pressures are being exerted, who is exerting them, what these pressures are, how or by what means they are exerted and where they occur. The five institutional antecedents are cause, constituents, content, control and context.

Coding rules: any piece of text expresses explicitly or implicitly ERP system's institutional logics could be coded under one of the following ***codes***:

A. The meaning of ERP system (content of ERP system as an institution).
B. The principles of ERP system (how it guide activities, what are its goals, norms or values).

- Control.

C. The assumptions of ERP system.

- Standardisation.
- Integration.
- Visibility (transparency).
- Data consistency.
- Multiple ways of control.
- Automation.
- Compensating controls.
- Preventive controls.

- Continuous monitoring.
- Transparency.
- Centralisation.

D. How ERP system forms internal audit identities.

- The identity of bureaucratic, hierarchical administrative practice.

E. ERP system explicit and repetitive administrative routines.

- The domain of very explicit procedures.

F. Cause (why these pressures are being exerted).
G. Constituents (who is exerting them).
H. Content (what these pressures are).
I. Control (how or by what means they are exerted).
J. Context (where they occur).

C.3 Alignment Efforts

Any differences between the structures embedded in the organisation (as reflected by its procedures, rules and norms) and those embedded in the package.

Coding rules: any piece of text expresses explicitly or implicitly ERP system's institutional logics could be coded under one of the following ***codes***:

A. Reengineering.
B. Customisation.
C. IAF role in ERP implementation.
D. Change management.
E. Alignment.

C.4 The IAF Change

The internal audit change process can be viewed as a response to the new ERP systems which constrains the activities and shapes the

cognitive processes of internal auditors. Internal auditors have a number of potential strategic responses to the new institutional logics. The understanding of conflicts is essential to analyse a range of internal auditors' responses to new ERP systems in the corporate governance environment. In order to determine the nature of the strategic response of the IAF, changes in the characteristics of the internal audit structure and practice are investigated.

Coding rules: any piece of text expresses explicitly or implicitly changes in the internal audit function, internal audit responses or internal audit tactics could be coded under one of the following ***codes***:

A. Scope of services (practice).
B. Skills.
C. Tools.
D. Position and internal relations.
E. Source.
F. Budget.
G. Size.
H. Relation with the external auditor.
I. Structure.
J. Acquiescence strategy is a conscious intent to conform. It is expressed through the tactics of

- Habit (following invisible, taken-for-granted norms).
- Imitation (mimicking institutional models).
- Compliance (obeying rules and accepting norms).

K. Compromise strategy is used when own interests are promoted through tactics such as

- Balancing (balancing the expectations of multiple constituents).
- Pacifying (placating and accommodating institutional elements).
- Bargaining (negotiating with institutional stakeholders).

L. Avoidance strategy is an attempt to prevent the need to conform to an external pressure using avoidance tactics as

- Concealing (disguising non-conformity).
- Buffering (loosening institutional attachments).

- Escaping (changing goals, activities or domains).

M. Defiance strategy is the rejection of institutional norms using defiance tactics which include

- Dismissing (ignoring explicit norms and values).
- Challenging (contesting rules and requirements).
- Attacking (assaulting the sources of institutional pressure).

N. Manipulation strategy is the purposeful and opportunistic application of the tactics of

- Co-opting (importing influential constituents).
- Influencing (shaping values and criteria).
- Controlling an institutional pressure (dominating institutional constituents and processes).

C.5 The IAF Legitimacy

Internal auditing has its legitimacy, and at the same time, it produces legitimacy. The IAF legitimacy as a corporate governance tool comes from its effective rule in assuring internal control and in supporting risk management.

Coding rules: any piece of text expresses explicitly or implicitly the IAF role could be coded under one of the following

A. Internal control.
B. Risk management.
C. Importance (prestige, position, status).

Any new theme related to any of the previous categories can be added under a new code.

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